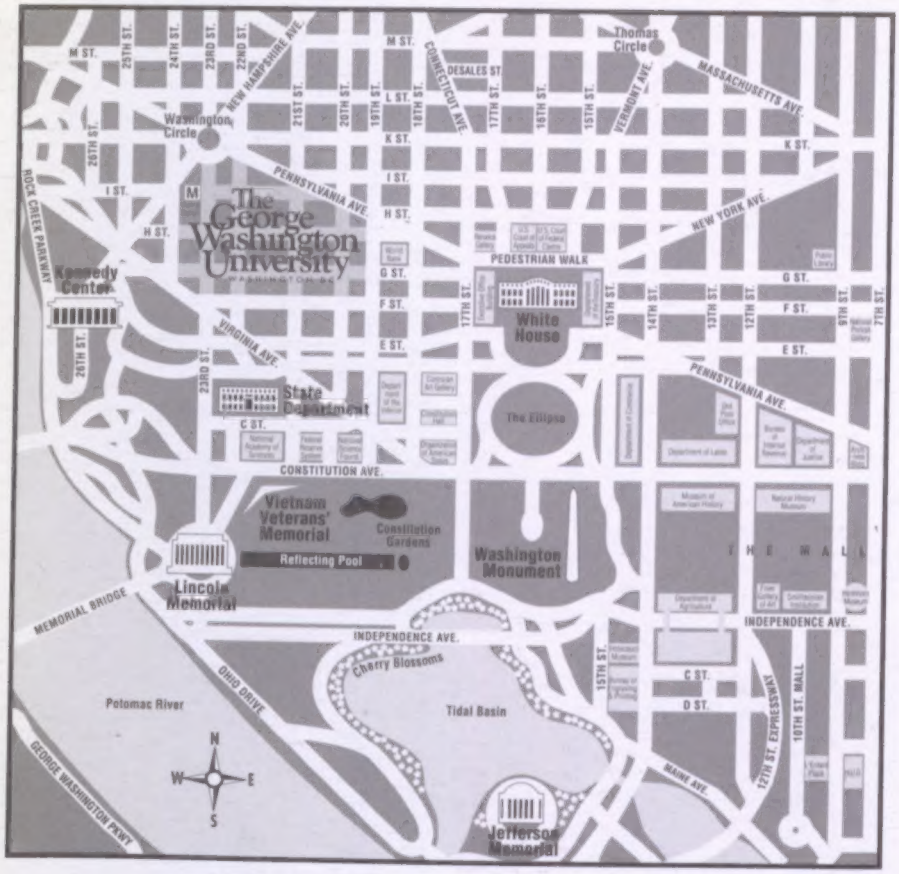
The George Washington University Bulletin



Undergraduate Programs 1998-1999



THE GEORGE WASHINGTON UNIVERSITY BULLETIN

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THE GEORGE WASHINGTON UNIVERSITY BULLETIN



UNDERGRADUATE PROGRAMS 1998–1999

Columbian School of Arts and Sciences

School of Business and Public Management

School of Engineering and Applied Science

Elliott School of International Affairs

Please address correspondence to the office concerned at The George Washington University, Washington, D.C. 20052; telephone (202)994-1000. For information concerning Graduate Programs, the Law School, the School of Medicine and Health Sciences, the School of Public Health and Health Services, or the Summer Sessions, please request the appropriate Bulletin.

http://www.gwu.edu

喬治華盛頓大學願回答你的問題，如果書內沒有解答，請用英文書面詢問。地址見第一頁。

お問い合わせありがとうございました。同封の大学ガイドで不明の点は1ページ記載の各学部宛に英語でお問い合わせ下さい。

저희 대학에 관심을 가져주셔서 감사합니다. 혹시 이 책자에서 언급되지 않은 면에 대하여 의문나는 점이 있으시면 앞에 명기된 조지 워싱턴 대학교 주소로 영어로 문의해 주시기 바랍니다.

جامعة جورج واشنطن ترحب بكم وتشكر لكم اهتمامكم. برجاء الكتابة إلينا باللغة الانجليزية على عنواننا بالصفحة الأولى إذا كان لديكم أية استفسارات أخرى.

La Universidad de George Washington le agradece su interés. Si necesita información adicional a la incluída en este Boletín, por favor, diríjase por escrito, en inglés, a la dirección de George Washington University indicada en la primera página de esta publicación.

Information in this bulletin is generally accurate as of fall 1997. The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.

Program information needed to fulfill a major or field appears under the name of the department or program concerned in Columbian School of Arts and Sciences and the Elliott School of International Affairs. For the School of Business and Public Management and the School of Engineering and Applied Science, program information appears under the school's entry.

Depending on the degree program, students must fulfill program requirements stated in the bulletin in effect at the time they matriculate or declare their major. Any subsequent changes in programs that may appear in future bulletins do not affect the program a student has already entered.

The entries under Courses of Instruction represent departments and programs, rather than all categories of courses taught. For example, to find Chinese, Japanese, Korean, or Vietnamese courses, look under East Asian Languages and Literatures; to find French, Italian, or Spanish courses, look under Romance Languages and Literatures.

CONTENTS

5 The Academic Calendar
7 The University
16 Columbian School of Arts and Sciences
29 School of Business and Public Management
41 School of Engineering and Applied Science
54 Elliott School of International Affairs
59 School of Medicine and Health Sciences
School of Public Health and Health Services
60 Courses of Instruction
62 Accountancy
63 Africana Studies
64 American Studies
66 Anthropology
70 Applied Science
71 Art
78 Biological Sciences
82 Business Administration
84 Chemistry
86 Civil, Mechanical, and Environmental Engineering
90 Classics
93 Columbian School Advising Workshop
93 Communication
95 Counseling/Human and Organizational Studies
95 Dramatic Literature
96 Early Modern European Studies
96 East Asian Languages and Literatures
99 East Asian Studies
99 Economics
103 Educational Leadership
103 Electrical Engineering and Computer Science
111 Engineering Management
111 English
117 English as a Foreign Language
118 Environmental Studies
120 Finance
120 Forensic Sciences
121 Geography
123 Geology
125 German and Slavic Languages and Literatures
128 Health Sciences
129 History
134 Honors
136 Humanities
137 International Affairs
139 International Business
140 Judaic Studies
141 Latin American Studies
141 Liberal Arts
142 Linguistics
142 Management Science
143 Marketing
144 Mathematics
148 Media and Public Affairs
153 Middle Eastern Studies
154 Music

158 Naval Science
160 Operations Research
161 Peace Studies
161 Philosophy
164 Physics
167 Political Science
171 Psychology
174 Public Administration
174 Religion
177 Romance Languages and Literatures
183 Service–Learning Program
183 700 Series
183 Sociology
188 Speech and Hearing
189 Statistics
192 Strategic Management and Public Policy
192 Teacher Preparation and Special Education
193 Theatre and Dance
196 Tourism and Hospitality Management
197 University Professors
200 Women's Studies
202 Faculty and Staff of Instruction
253 Admissions
258 Special Programs
259 Division of University Programs
261 Summer Sessions
262 Student Services
267 Financial Aid
274 Prizes
277 University Regulations
285 Fees and Financial Regulations
288 Index

Bachelor of Science in Health Sciences degree programs in the fields of clinical laboratory science, emergency medicine, and radiological sciences are offered by the School of Medicine and Health Sciences. The School of Public Health and Health Services offers a Bachelor of Science degree program in the field of exercise science. For information on these programs, please contact the GW Office of Recruitment and Admissions for Health Sciences and Public Health, (202) 994-2807, hsphadmit@gwumc.edu.

THE ACADEMIC CALENDAR 1998–1999

August 1998

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1998	**Fall Semester**
August 20–21	Advising and testing begin for entering students
August 24	Classes begin
August 24–28	Late registration
September 7	Labor Day (holiday)
October 1	Applications due for winter graduation
October 12	Columbus Day (holiday)
November 4	Registration for spring semester classes begins*
November 25–27	Thanksgiving holiday
December 7	Last day of regular fall semester classes
December 8	Makeup classes
December 9–11	Reading period
December 14–22	Examination period

*Registration dates are tentative; consult the *Schedule of Classes*.

1999	**Spring Semester**
January 8	Advising and testing for entering students
January 11	Classes begin
January 11–15	Late registration
January 18	Martin Luther King Day (holiday)
February 1	Applications due for May graduation
February 15	George Washington's birthday observed (holiday)
March 15–19	Spring recess
March 31	Registration for fall semester classes begins*
April 26	Last day of regular spring semester classes
April 27	Designated Monday
April 28	Makeup classes
April 29–30	Reading period
May 3–11	Examination period
May 16	Commencement

*Registration dates are tentative; consult the *Schedule of Classes*.

THE UNIVERSITY

History

The George Washington University had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of 50 shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended a "fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of 46 acres between the present 14th and 15th Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between 13th and 15th Streets.

During the last half-century, the University's campus has been developed in that section of the old First Ward familiarly known as Foggy Bottom, between 19th and 24th Streets, south of Pennsylvania Avenue. The area has many reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 I Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for 50 years the pastor of a church at 19th and I Streets, and Washington selected 23rd and E Streets as the site of the National University he hoped to see established.

Location

The University's main campus is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the National Academy of Sciences, the John F. Kennedy Center for the Performing Arts, and many other governmental and cultural institutions. GW's Virginia campus, initiated for graduate studies, research projects, and professional development programs, is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

Mission Statement

The George Washington University, an independent academic institution chartered by the Congress of the United States in 1821, dedicates itself to furthering human well-being. The University values a dynamic, student-focused community stimulated by cultural and intellectual diversity and built upon a foundation of integrity, creativity, and openness to the exploration of new ideas.

The George Washington University, centered in the national and international crossroads of Washington, D.C., commits itself to excellence in the creation, dissemination, and application of knowledge.

To promote the process of lifelong learning from both global and integrative perspectives, the University provides a stimulating intellectual environment for its diverse students and faculty. By fostering excellence in teaching, the University offers outstanding learning experiences for full-time and part-time students in undergraduate, graduate, and professional programs in Washington, D.C., the nation, and abroad. As a center for intellectual inquiry and research, the University emphasizes the linkage between basic and applied scholarship, insisting that the practical be grounded in knowledge and theory. The University acts as a catalyst for creativity in the arts, the sciences, and the professions by encouraging interaction among its students, faculty, staff, alumni, and the communities it serves.

The George Washington University draws upon the rich array of resources from the National Capital Area to enhance its educational endeavors. In return, the University, through its students, faculty, staff, and alumni, contributes talent and knowledge to improve the quality of life in metropolitan Washington, D.C.

University Policy on Equal Opportunity

The George Washington University does not unlawfully discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, veteran status, or sexual orientation. This policy covers all programs, services, policies, and procedures of the University, including admission to education programs and employment. The University is subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Associate Vice President for Human Resources, The George Washington University, Washington, D.C. 20052, (202)994-4433, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

The Schools

The George Washington University includes eight academic units, as follows:

Columbian School of Arts and Sciences offers undergraduate programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music and graduate programs leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Science, Master of Science in Forensic Science, Master of Philosophy, Doctor of Philosophy, and Doctor of Psychology.

The School of Medicine and Health Sciences offers programs leading to the degrees of Bachelor of Science in Health Sciences, Master of Science in Health Sciences, and Doctor of Medicine.

The Law School offers programs leading to the degrees of Juris Doctor, Master of Laws, and Doctor of Juridical Science and special programs in continuing legal education.

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: civil engineering, computer

engineering, computer science, electrical engineering, mechanical engineering, and systems analysis and engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Management, Engineer, Applied Scientist, and Doctor of Science.

The Graduate School of Education and Human Development offers programs leading to the degrees of Master of Arts in Education and Human Development, Master of Arts in Teaching, Master of Education, Education Specialist, and Doctor of Education.

The School of Business and Public Management offers undergraduate programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration and graduate programs leading to the degrees of Master of Accountancy, Master of Business Administration, Master of Public Administration, Master of Science in Finance, Master of Science in Information Systems Technology, Master of Science in Professional Accounting, Master of Science in Project Management, Master of Taxation, Master of Tourism Administration, and Doctor of Philosophy.

The Elliott School of International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degrees of Master of Arts and Master of International Policy and Practice.

The School of Public Health and Health Services offers programs leading to the degrees of Bachelor of Science, Master of Science, Master of Public Health, Master of Health Services Administration, Specialist in Health Services Administration, and Doctor of Public Health.

Accreditation

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. The Commission on Accreditation of Allied Health Education Programs has accredited the health sciences programs in diagnostic medical sonography and physician assistant. The clinical laboratory science program is accredited by the National Accrediting Agency for Clinical Laboratory Science. The Joint Review Committee for Nuclear Medicine Technology has accredited the nuclear medicine technology program. The radiation therapy program is accredited by the Joint Review Committee on Education in Radiologic Technology. The public health programs have full accreditation from the Council on Education for Public Health. The program in health services administration is accredited by the Accrediting Commission on Education for Health Services Administration. All undergraduate engineering curricula of the School of Engineering and Applied Science are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The computer science curriculum is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board. The Graduate School of Education and Human Development is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its eligible master's and doctoral degree programs: the master's programs in school and community counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs: the master's program in reha-

bilitation counseling is accredited by the Council on Rehabilitation Education. The School of Business and Public Management joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business; the Assembly accredited its undergraduate program in 1977 and its master's program in 1982. The programs in accountancy satisfy the educational requirements for the Certified Public Accountant and the Certified Management Accountant professional examinations. The Master of Public Administration program is on the approved list of the National Association of Schools of Public Affairs and Administration. The Department of Chemistry is on the approved list of the American Chemical Society. The Department of Music is an accredited member of the National Association of Schools of Music. The graduate program in clinical psychology in the Department of Psychology is on the approved list of the American Psychological Association. The graduate program in speech–language pathology and audiology is accredited by the Education and Training Board of the Boards of Examiners in Speech–Language Pathology and Audiology.

Consortium of Universities of the Washington Metropolitan Area

The George Washington University is a member of the Consortium of Universities of the Washington Metropolitan Area. Ten universities in the Washington area—American University, Catholic University of America, Gallaudet University, George Mason University, George Washington University, Georgetown University, Howard University, Marymount University, the University of the District of Columbia, and the University of Maryland—are associated in a Consortium through which they coordinate the use of their respective facilities; Mount Vernon College and Trinity College are associate members of the Consortium. Students in approved programs leading to degrees in any one of these institutions have the opportunity to select from the combined offerings the particular courses that best meet their needs. This privilege is subject to regulations of the school in which the student is enrolled. Participation is limited to degree candidates. Law and medical students are excluded from participation, except for LL.M. candidates. See the *Schedule of Classes* for specific regulations and information concerning registration for Consortium courses.

Registration forms and instructions are available from the registrar of the institution in which the student is enrolled. Students register and pay tuition at their own institutions for all Consortium courses; course fees are payable to the visited institutions.

The University Libraries

The library collections of the University are housed in the Melvin Gelman Library (the general library of the University) and in the Jacob Burns Law Library and the Paul Himmelfarb Health Sciences Library.

These collections contain more than 1,700,000 volumes. University appropriations supplemented by endowments and gifts provide research materials in the social sciences, the humanities, the sciences, and business. Gifts from many sources have enriched the collections, including a large National Endowment for the Humanities grant to strengthen the University's humanities holdings. The libraries hold over 18,000 serials.

Information concerning the use of the libraries may be obtained from the GW Information System, Gelman home page, and at library service desks. Individual and class instruction in the use of the library and orientation to library facilities are given by librarians upon request as well as through print, media, and computer-assisted instruction. The libraries strive to fulfill the curricular and research needs and interests of the students. Through computerized searches of bibliographic databases, students identify and locate desired research materials not easily found through more traditional methods. The staff

assists all members of the University in using the rich resources of the Washington area and the unusual opportunities they offer for extensive research.

Students, faculty, and staff at George Washington University (except law and medical students) may borrow directly from the main campus libraries of six other academic institutions in the Washington Research Library Consortium (WRLC). Students may also obtain books and journal articles on interlibrary loan from other libraries in the area and throughout the United States.

ALADIN is the electronic library resource of WRLC and contains the combined on-line catalog of the seven member universities with more than 4.3 million records, as well as a rich array of electronic databases, indexes, and full texts. ALADIN can be accessed from numerous computers in the libraries as well as remotely from on and off campus.

GW Television

The primary television resource of the University is GW Television, a state-of-the-art multichannel broadcast and production facility. GW Television develops courses and programs in cooperation with academic departments for broadcast on and off campus over various satellite and cable networks; produces videotapes for class use and for continuing professional education; offers national and international satellite videoconferencing; operates the George Washington University Television Network (GWUTN); and is developing compressed video links between remote campus locations.

GW Television has both C and Ku-band satellite reception capabilities and can deliver programs received via satellite to many on-campus locations.

General Alumni Association

The objectives of this organization are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Membership in the Association is conveyed automatically to anyone who has been graduated from any school or division of the University. Anyone who has earned 15 credit hours or the equivalent at the University, who has left the University in good standing, and whose class has graduated is eligible for membership; in the case of the Division of University Programs students, however, only the "15 credit hours earned" requirement and not the "graduation of the class" requirement applies. Graduates of Center for Career Education certificate programs are also eligible.

A Governing Board, composed of members representing the constituent alumni organizations, directs the activities of the Association. The voluntary leadership of the Association works closely with the staff of the Office of Alumni Relations in carrying out Association affairs. The Association may be contacted through the Office of Alumni Relations.

The Board of Trustees of the University

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member. Trustees who are GW alumni are indicated by an asterisk. Locations are indicated for trustees outside the Washington metropolitan area.

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COLUMBIAN SCHOOL OF ARTS AND SCIENCES

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Executive Associate Dean E.A. Caress
Associate Deans F.C. Arterton, N.K. Khatcheressian, S. Ladisch (*Interim*), K. Moreland, D.A. Rowley, C.H. Sterling

Introduction

Since its founding in 1821, Columbian College, the original college of liberal arts and sciences of George Washington University, has been the cornerstone of the campus community. A successor to Columbian College, the Columbian School of Arts and Sciences today houses all undergraduate and graduate programs in the arts and sciences, offering bachelor's, master's, and doctoral degrees. With a full-time faculty of about 350, the School offers its 3,900 undergraduates the advantages of a small liberal arts institution as well as opportunities for professional and pre-professional education in many fields and for internships in a stimulating urban environment.

The rich and diverse arts and sciences curriculum is designed to strengthen the student's ability to communicate, to reason, and to understand the social, cultural, and physical environment. This purpose is accomplished through the study of various disciplines—the humanities, the social sciences, and the mathematical and natural sciences. With this foundation, Columbian School graduates are well prepared for a wide range of jobs or for more specialized professional and graduate education. The School offers programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music. Students may elect one of more than 40 departmental majors, or they may elect double majors, interdisciplinary majors, or individualized degree programs. Special curricular guidance is given to students planning to apply to a medical or law school.

Entrance Requirements

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics beyond introductory algebra. Typically, at least a *B* average or equivalent is required. Students admitted with deficiencies in secondary school units will be required to remove such deficiencies within the first year through appropriate courses or examinations.
2. Standardized test scores submitted on SAT I or ACT and on SAT II subject tests in writing, mathematics, and one other subject of the student's choice.
3. Admission to the Bachelor of Music curriculum requires, in addition to the above, a performance audition (a tape is acceptable) and/or music testing.

Admission With Advanced Standing

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University are listed below.

Applicants who have accumulated at least 30 hours (or the equivalent) of academic credit at another regionally accredited college or university may be admitted to Columbian School as transfer students with advanced standing. Those who have achieved a grade-point average of at least 2.5 on a 4.0 scale in previous college work will be given preference for admission. Applicants who have completed fewer than 30 hours of acceptable credit must meet the entrance requirements for freshmen.

Advanced standing may be awarded for properly certified courses for which the student received a grade of *C*– or above, provided that such courses are comparable to the curriculum requirements for the degree sought in Columbian School. No more than 18 credit hours of professional courses completed at another institution will be assigned toward a degree in Columbian School. In the case of course work completed at a two-year college, no more than 66 hours of credit may be applied as advanced standing toward a degree in Columbian School.

Although a grade of *D* in a course is not acceptable for transfer, the course may satisfy a curriculum requirement. Credits earned with a grade of *D* will not, however, be assigned as advanced standing.

Columbian School reserves the right to refuse credit for transfer in whole or in part or to accept credit provisionally.

It is the responsibility of the student to have an official transcript from each institution formerly attended sent directly to the Office of Admissions, George Washington University, Washington, D.C. 20052.

Students wishing to transfer from another division of the University into a degree program in Columbian School must submit to the Office of Admissions a formal application for transfer and must be in good academic standing with a cumulative grade-point average of 2.0 or above at the time of transfer. A maximum of 45 credit hours earned as a nondegree student in the Division of Continuing Education may be applied toward a degree in Columbian School.

All transfer students must satisfy the residence and course requirements for degrees awarded by Columbian School.

Regulations

See Admissions; Fees and Financial Regulations; University Regulations.

The Bachelor's Degrees

Columbian School offers undergraduate programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music. In cooperation with the School of Medicine and Health Sciences, two seven-year curriculums leading to the combined degrees of Bachelor of Arts and Doctor of Medicine and the Integrated Bachelor of Arts/Doctor of Medicine are offered.

One hundred twenty hours of course work must be passed and a grade-point average of at least 2.0 maintained. General curriculum, major, and other requirements described below must be met.

Each student must declare a major, usually in the sophomore year. A student may change the major with the consent of the dean and of the department or committee concerned; the student must meet the requirements for the new major in effect at the time the change is approved. At least 60 hours of course work must be taken outside the major-field department or major program. (This does not apply to the 129-hour Bachelor of Music curriculum.)

See Scholarship Requirements under University Regulations for an explanation of how the grade-point average is computed. See Scholarship Performance in the Major, below, for requirements applicable specifically to major programs.

All students, including those transferring from other institutions or from another school or division of this University, with major requirements wholly or substantially met, must satisfy the residence requirement of Columbian School stated below.

Residence

Students must complete 45 of the final 60 hours toward the degree in the School, including at least 12 hours of course work at the 100 level in the major field. (Students approved for study abroad must complete 45 of their final 75 hours in

the School.) Except in special circumstances, and then only with the approval of the dean, at least 9 of the final 15 hours must be completed in residence.

Courses applicable to the degree taken while registered in any division of The George Washington University in the semester or summer sessions immediately prior to admission to degree candidacy in Columbian School are counted as courses in residence.

Integrated Bachelor of Arts/Doctor of Medicine

In addition to the early selection program described under the School of Medicine and Health Sciences, the University offers a seven-year integrated B.A./M.D. program. The program has been designed for honors students of high ability and maturity who have decided, before applying to college, that they wish to become physicians and want to accomplish that goal in a shorter amount of time and at a lower overall cost than is usual. Detailed information on this program is available through the School.

Second Bachelor's Degree

Columbian School graduates who wish to receive a second bachelor's degree must satisfy the general School requirements and the requirements of their new major and degree and must complete 30 hours in residence in Columbian School. Students with undergraduate degrees from other institutions or from other divisions of the University, if admitted to the School, must meet the same set of requirements.

Advisory System

Students have the responsibility for determining their schedules and meeting degree requirements. Because faculty and staff advisors can help students learn to make well-informed choices, students are required to meet with an advisor prior to registering each semester and are encouraged to keep in close touch with their advisors.

Freshmen entering Columbian School participate in an advising system designed to provide students ready access to a knowledgeable member of the faculty. In this advising system, each freshman must register for CSAS 1, the Freshman Advising Workshop; each section of the course is led by a faculty member who will serve as the student's academic advisor. CSAS 1 is required for all new freshmen; it will be graded, but only with the grades of *P* or *NP*; the course does not count toward the 120 credits required for the standard B.A. or B.S. degree.

Once students declare their major, they will be advised by the faculty of their major department. Transfer students without declared majors will receive advising from an advisor in the School's Oxborough Student Services Center, while those with majors will be advised by their major department. Professional advisors are available year-round in the School's Oxborough Student Services Center for academic assistance and for an accurate appraisal of procedural issues that may arise in any student's program of study.

In addition to the academic advising provided by the faculty and the School's professional staff, the peer advising system allows students to consult with advanced students who have been specially trained to help students make informed choices as they construct their schedules each semester. A directory of peer advisors is available from the Oxborough Student Services Center.

Personal counseling is available through the office of the Dean of Students, the Counseling Center, the Multicultural Student Services Center, and the International Services office.

Students having academic difficulty, especially freshmen and sophomores taking lower-level courses who receive mid-semester warnings from their professors, should immediately consult with their professor or advisor in order to develop a plan for overcoming their problem. The Writing Center in the English Department and the Math Lab in the Mathematics Department both offer walk-in and by-appointment assistance; peer tutors and study skills workshops are available through the Counseling Center.

Scholarship Requirements

Academic Work Load

To encourage academic performance of high quality, the School limits the student's work load. After the freshman year, a full-time student who is not on probation may take a course load of up to 18 credit hours. A full-time student who, during the immediately preceding semester, has received no grades below *B*− and has earned grades of *A* or *A*− in three courses totaling at least 9 credit hours may take 19 hours. A student employed 20 or more hours per week should not attempt more than 10 credit hours per semester or 4 credit hours per summer session. The amount of work taken by a student on probation will be limited by the Student Appeals Committee.

Attendance

The student is held responsible for all work of the courses in which registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up work missed.

Classification of Students

A student becomes a sophomore upon completion of 30 credit hours, a junior upon completion of 60 credit hours, and a senior upon completion of 90 credit hours. An unclassified student is one who is not a candidate for a bachelor's degree (normally because the student already holds one) but who wishes for valid academic reasons to take a limited program for a limited time.

Leave of Absence and Continuous Enrollment

Students in Columbian School who wish to interrupt their studies must apply to the dean for either Continuous Enrollment or Leave of Absence (see University Regulations). If approved, either form of inactive status assures the student that, for at least one semester, re-entrance to the School may take place under regulations prevailing at the time of last registration. A student may re-apply for a second semester of either type of leave, but ordinarily such leave is only available for one calendar year. After two semesters of inactive status, the student is expected to resume active study toward a degree.

All study toward a degree program at any other college or university, in this country or abroad, undertaken by a continuing student must be approved by the dean in advance.

Academic Standing

A student who is not suspended or on probation is considered to be in good standing. The following rules governing probation and suspension are applicable to students enrolled for a full-time program (12 credit hours or more) during the fall or spring semester. (Students enrolled for less than 12 credit hours during the fall or spring semester and students enrolled during the summer sessions are subject to probation or suspension on the basis of their cumulative record, a "semester" being considered a time interval in which at least 12 credit hours have accrued.)

Probation—A student whose cumulative grade-point average is less than 2.0 (but 1.0 or more) after attempting a minimum of 24 credit hours will be placed on probation. The course load of a student on probation shall be no more than 13 credit hours. Probation will be removed if, after a first or second semester on probation, the student's grade-point average is raised to 2.0 or more. A student still on probation after two semesters (or 24 credit hours attempted) ordinarily will be suspended but may be continued on probation by the Student Appeals Committee (see below).

Suspension—The following circumstances constitute grounds for suspension: (1) a cumulative grade-point average below 1.0 after attempting a minimum of 24 credit hours; (2) failure to attain a cumulative grade-point average of 2.0 or more after two successive semesters (or 24 credit hours attempted) on probation. The Student Appeals Committee may continue a student on probation (in lieu of suspension) if satisfactory progress is demonstrated during the probationary period and sufficient evidence of academic promise, by way of a statement of appeal, is offered by the student.

The minimum period of academic suspension is one fall or one spring semester. Final dates for applying for readmission are the same as those governing undergraduate admission (see Admissions). A suspended student seeking readmission must submit evidence to the Student Appeals Committee of conduct during absence from the University that indicates that the student will profit from readmission. A student suspended twice for poor scholarship will not be readmitted.

Semester Warning—A student whose cumulative grade-point average is less than 2.0 after attempting a minimum of 12 credit hours will be issued a warning notice at the end of the semester and will be strongly advised to take corrective measures (e.g., limitation of course load to no more than 13 credit hours).

Mid-semester Warning—When, at the end of the eighth week of each semester, instructors file in the Oxborough Student Services Center the names of freshmen who are doing unsatisfactory work, a notice of warning is sent to the student and a copy filed with the appropriate advisor. A warning constitutes notice to the student to consult the instructor and advisor at the earliest opportunity.

Adding and Dropping Courses

After registering, a student may add or drop courses only by means of procedures established by the Registrar. Failure to follow these procedures when dropping a course may result in a failing grade. The deadline for adding a course during the regular fall or spring semester is the end of the second week of classes.

The deadline for dropping a course without academic penalty is the end of the eighth week of classes in the fall and spring semesters. A course dropped during the first four weeks of classes will not appear on a student's transcript. A course dropped after the fourth week but before the end of the eighth week will be assigned the grade of *W* (authorized withdrawal).

The deadline for complete withdrawal from a student's entire program of courses without academic penalty is the end of the ninth week of classes.

After the deadlines, program changes are not possible unless the student presents a petition to the dean and receives permission.

Incompletes

Conditions under which the grade of *I* (Incomplete) may be assigned are described under University Regulations.

Changing an Incomplete—Incomplete work must be completed no later than one calendar year from the last day of the examination period of the semester

or summer session in which the grade of *I* was assigned. When work for the course is completed, the grade earned will be indicated in the form of *I*, followed by the grade. The indication of *I* cannot be removed from the transcript. A grade of *I* that is not changed within this period automatically becomes part of the student's record. The grade of *I* cannot be changed by reregistering for the course here or by taking its equivalent elsewhere. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the dean or the Student Appeals Committee for additional time in which to complete the work of the course. Such petitions should be submitted within a year of the assignment of the grade of *I*.

Dean's List and Dean's Commendation List

The name of any student who takes 15 credit hours or more of graded course work in any one semester and attains a semester grade-point average of 3.5 or more with no grades below *B*− will be placed on the Dean's List for that semester. A course taken on a Pass/No Pass basis beyond the 15-hour minimum of other courses does not affect the student's eligibility for the Dean's List, nor are the credit hours of such a course computed in the above figures. A grade of No Pass, however, disqualifies the student from the Dean's List.

The name of any part-time student who achieves a cumulative grade-point average of 3.5 or more upon completion of 30, 60, and 90 credit hours and upon graduation will be placed on the Dean's Commendation List.

Placement, Waiver, and Credit Examinations

Preliminary Placement Examinations

Many departments in Columbian School, including English, mathematics, and all foreign languages, require students to take placement tests to determine level of proficiency or eligibility for specified courses. The student is placed in an appropriate course on the basis of these tests. There is no charge to the student for placement tests, and no credit (advanced standing) is awarded for courses bypassed or waived as a result of these tests.

English—Students whose scores on the SAT II in writing suggest that they will benefit from more intensive training in compositional skills may be assigned to Engl 9 or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill before placement in either Engl 9 or 10. Students whose scores indicate superior competence will be allowed to waive the Engl 10 requirement.

English as a Foreign Language—see Admissions.

Foreign Languages—A student who has not been granted advanced standing and who wishes to continue at GW the language begun in high school must take a placement examination, which is offered in Arabic, Chinese, French, German, Greek, Hebrew, Italian, Japanese, Korean, Latin, Russian, and Spanish. Upon completion of the examination, assignment is made to the appropriate course.

Mathematics—New students who wish to register in Math 20, 30, or 31 are required, prior to registration, to take a placement examination in algebra and trigonometry; those wishing to register in Math 51 are required, prior to registration, to take a placement examination in algebra.

Earning Credit by Examination

Assuming there is no duplication of course credit earned, a maximum of 30 credit hours may be assigned for any combination of the following:

College Board Advanced Placement Tests—See Admissions. Credit may be granted for college-level courses taken in an approved secondary school if substantiated by satisfactory performance on the Advanced Placement Tests.

College Board College-Level Examination Program (CLEP)—See Admissions.

Special Departmental Examinations—A student may request any department of Columbian School to offer a special examination covering the subject matter of any specific course. The student must offer evidence of sufficient background to have a reasonable command of the subject matter. Departments reserve the right to deny such requests. Assigning credit by special departmental examinations will depend on the department's evaluation of the examination paper. These examinations will normally be of at least three hours' duration. A fee is charged for preparation, administration, and grading of each course examination.

Credit by special departmental examination is not permitted for the first two years of college-level courses in a native language other than English. A student who has previously taken examinations to waive course requirements may not subsequently take examinations for credit in the same courses.

Waiving Introductory Courses by Examination

Several departments in Columbian School, including English, history, and sociology, offer periodic waiver examinations for introductory courses. Such examinations may be attempted at the option of the student; a fee is charged. Specific departments should be consulted for further details. Passing a waiver examination does not entitle a student to any credit toward the degree.

General Curriculum Requirements

All candidates for the degree of Bachelor of Arts or Bachelor of Science are admitted to a general arts and sciences curriculum until they declare a major field. Bachelor of Music candidates are admitted directly into the departmental curriculum.

Students should plan to satisfy many of their general curriculum requirements before they commit themselves to a specific major. General curriculum requirements are established by the Arts and Sciences faculty as a whole and administered through its elected committees. Students must demonstrate that they have attained an acceptable level of cultural literacy and intellectual competence and that they have acquired familiarity with the breadth and diversity of liberal learning. Students must satisfy these requirements in eight distinct categories of fundamental competencies and areas of knowledge that form a basis for future course work. Students may satisfy all or part of a specific requirement either through course work or by examination.

The eight categories of general curriculum requirements are listed below, along with specifically approved courses. When an equivalent course is offered by the University Honors Program, the Honors course may be substituted. Additional courses beyond those listed in each category may be authorized from time to time by the Curriculum Committee; please consult the Oxborough Student Services Center for a supplemental list of appropriate courses prior to registration each semester.

Unless otherwise specified, the indicated paired sequences of courses must be selected. No course may be taken to fulfill requirements in more than one of the eight categories, even though some courses may be listed in more than one category. The rationale for each requirement follows the listing of courses.

1. *Literacy*—6 hours: Engl 9 or 10 or EFL 50, and Engl 11 or 13. Unless waived, the first semester of English composition must be taken in the freshman year. The second semester (Engl 11 or 13) must be taken no later than the second semester of the sophomore year.

The required courses in English composition develop the ability to read with a high level of comprehension and to communicate effectively and maturely in writing.

2. *Quantitative and/or Logical Reasoning*—Math 31 or 6 hours chosen from one of the following combinations: Phil 45 and 121; Honr 28 or Stat 51 or 53 or 91

or 111, and Stat 105 or 112 or 129; Stat 129–30; Math 9–10, 20–21, 51–52, or 120 and 135; Honr 28 or Phil 45, and Math 120 or Stat 51 or 53 or 91 or 111.

Since argumentation and quantitative evidence play important roles in social and political discourse, students must develop a capacity for critical reasoning that can be applied in all disciplines. This requirement stresses the ability to think logically and critically, to reason symbolically or with numerical data, and to formulate and analyze arguments.

3. *Conceptual Foundations and Development of Natural Science*—9 hours chosen from the courses listed below, distributed so that 3 or 6 hours come from Group A and 3 or 6 hours come from Group B (the 6-hour group must be a paired sequence): Group A: BiSc 3–4 or 11–12; Geol 1–2; Geol 5 and either 2 or 105. Group B: Astr 1–2; Chem 3–4 or 11–12 or 17–18; Phys 1–2 with 5–6; Phys 7; Phys 8; Phys 21–22 with 5–6.

The natural world acts in accordance with basic laws and fundamental principles that are not dependent on human expectations, but that are susceptible to experimental verification. Because the application of these laws has profoundly transformed the modern world, a rigorous understanding of the principles of natural science and how science develops from experiment and observation to theory and then to the testing of theoretical predictions is an essential component of a liberal education. Students learn how scientific experiments are designed, how results are interpreted, and how scientific problems of practical importance are addressed and solved. The courses, therefore, include a laboratory.

4. *Social and Behavioral Sciences*—6 hours chosen from one of the following combinations: Econ 11–12; Geog 1–2; PSc 1, 2, 3; PSc 11–12; or any two of the following courses: Anth 2, Psyc 1, Soc 1, SpHr 71.

In order to develop an understanding of the ways in which structures and processes in society and personality shape public events and the behavior of individuals and groups, students should have a broad introduction to the subject matter of one or more of the social or behavioral sciences. This introduction should include the range of topics and problems covered, some empirical results in the literature, and implication of these results for social and behavioral issues. Students gain an appreciation for theory and methods of analysis, evidence, and proof in that social or behavioral science.

5. *Creative and Performing Arts*—3 hours chosen from the following: Art 21, 23, 41, or 42; Engl 81; Mus 3, 4, 7, 8, or applied music courses in voice, a single instrument, or jazz performance (Mus 11–50, 57–63, 111–20, 155–60), or a single ensemble (Mus 51–56, 153); Phil 162; EMda 171; TrDa 11, 14, 45, 46, 50–62, or advanced performance courses.

Through courses that require participation in a creative or performing art or that develop a basis for evaluating artistic creativity, students will gain an understanding of the role of the imagination and its expression; insight into the interactions among materials, talent, and imagination; and sensitivity to the diverse elements involved in the arts.

6. *Literature*—6 hours chosen from one of the following combinations: Chin 163–64; Clas 107–108; Engl 51–52, 61–62, 71–72, 73–74, 91–92; Fren 53–54; Ger 91–92; Japn 111–12; Rel 9–10; Slav 91–92; Span 53–54, 55–56. (Additionally, students may satisfy this requirement by completing 6 hours of course work at the 100-level in a single foreign literary tradition taught in the foreign language.)

The study of literature acquaints students with the achievements of artists of the written word; introduces them to a range of genres, literary characters, and social and philosophical questions; and provides them with an enhanced understanding of history and culture. Students also learn to read critically and to grasp the relationship between individual texts and literary traditions.

7. *Western Society and Civilization*—6 hours chosen from one of the following combinations: AmSt 71–72; Art 31–32; Clas 71–72; Hist 39–40, 71–72; Phil 51–52; Rel 1–2; WStu 1–2; or any two courses chosen from Hmn 1, 2, 3, 4, 5.

The study of Western society and civilization enables the student to understand the relation of the present to the past in that cultural tradition. Course work that fulfills this requirement deals with the broad historical forces, including social, economic, intellectual, and cultural elements, that have shaped Western life.

8. *Foreign Language or Culture*—either option A or option B as follows.

A. Foreign Language—A student must demonstrate competence beyond the elementary level in a language other than English taught at GW. A student who wishes to continue the same language studied in high school must take the language placement test; in some cases, placement may be determined by performance on standardized achievement tests.

In order to satisfy this requirement, the student must demonstrate competence at the level of the following courses, by either course work or examination: Arab 4; Chin 4 or 6; Fren 4; Ger 4 or 6; Grek 3; Hebr 4; Honr 82; Honr 84; Ital 4; Japn 4; Kor 4; Latn 3; Slav 4 or 6; Span 4.

The student should be aware that in many instances foreign languages are required for the major or recommended as preparation for advanced work. The student should consult the advisor so that foreign language may be included, as appropriate, in the student's program.

Acquisition of basic communication skills in more than one language is a start in overcoming linguistic barriers in culturally diverse environments. The study of a foreign language also enables students to understand their own language better. Students preparing for graduate study are especially advised to study an appropriate foreign language.

B. Foreign Culture—6 hours chosen from one of the seven categories listed below. (1) *East Asia*—Anth 175; Art 187; Chin 161, 163–64; Hist 118, 187; Hmn 6; IAff 91; Japn 111–12, 162; Rel 160; Soc 182. (2) *Middle East*—Anth 177; Clas 81, 82, 100, 101; Geog 154; Hist 193, 194; Hmn 8; Rel 23, 107, 161. (3) *Latin America*—Anth 172; Geog 161; Hist 161, 162, 163, 164; IAff 90; PSc 183. (4) *Africa*—Anth 178; Geog 164; Hmn 7; IAff 93; PSc 180, 181. (5) *Russia/Soviet Union*—Hist 145, 146; IAff 92; Slav 91–92, 161, 162. (6) *South Asia*—Anth 174; Art 188; Hmn 6; Rel 157, 158, 159, 160. (7) *Europe*—Art 109, 110, 121, 122; Hist 131–32, 136, 141, 142; PSc 130.

The ability to appreciate significant aspects of a foreign culture distinguishes an educated student. Courses satisfying this requirement provide a broad introduction to cultural elements of a major area of the world outside North America.

The Major

In order to declare a major, all students must secure the advisor's signature on a form obtainable in the Oxborough Student Services Center and return the form to that office. No student is considered to have a major until this process is completed. Thereafter, the student receives academic guidance from a faculty advisor in the major-field department. In most cases, filing of the approved declaration form assures the student of admission to the major declared; however, if space, equipment, or other requirements compel a department or major program to limit the number of students in that major, admission to the major may be on a selective or space-available basis.

A change in degree candidacy within Columbian School (e.g., from Bachelor of Arts to Bachelor of Science) requires the permission of the dean. The degree requirements effective at the time the change is approved must be met.

Major Fields

All fields listed below (except those offered by the Department of Statistics) may lead to the Bachelor of Arts degree; a Bachelor of Science degree may be elected in those fields indicated by an asterisk.

American Studies
Anthropology
*Applied Mathematics
Archaeology
Art History
Art History and Fine Arts
*Biology
*Chemistry
Chinese Language and Literature
Classical Humanities
Communication
Criminal Justice
Dance
Dramatic Literature
Early Modern European Studies
*Economics
Electronic Media
English
*Environmental Studies
Fine Arts
French Language and Literature
Geography
*Geology
German Language and Literature
History
Human Services
Japanese Language and Literature
Journalism
Judaic Studies
*Mathematics
Music
Philosophy
*Physics
Political Communication
Political Science
Program in the Liberal Arts
Psychology
Religion
Russian Language and Literature
Sociology
Spanish-American Literature
Spanish Language and Literature
Speech and Hearing Science
*Statistics
Theatre

Scholarship Performance in the Major

Majors are defined in terms of credit hours, required courses, and the attainment of grades no lower than *C*– in the minimum required 100-level courses taken in the major field. If a student receives a grade of *D*+, *D*, or *D*– in a 100-level course specifically required in the major, the major department or program may permit the course to satisfy a curricular requirement even though it would not normally count toward the minimum number of hours required for the major. However, the department or program may instead require the student to repeat the course until a satisfactory grade (*C*– or better) is earned. (The department chair or program director must authorize such repetition in a memo to the Oxborough Student Services Center, before the student may register a second time.) Once the student has completed the course with a satisfactory grade, credit hours earned the first time the course was taken will count toward the minimum number of hours required in the major. Credit earned for the repetition will not count toward the degree. The minimum specific requirements for majors are listed under the department concerned in Courses of Instruction. The chair of the department, or designated departmental advisor, should be consulted before registration concerning the student's program of courses; the entire program, including electives, must be approved by the department. The student is also expected to consult a departmental advisor in all matters affecting the program of studies, such as changes, substitutions, or withdrawals.

Some majors require satisfactory completion of entry, proficiency, or concluding examinations in addition to courses.

Double Majors

A student who completes the requirements of two major fields in Columbian School (for example, mathematics and physics, or history and economics) may graduate with a double major. Such a student should consult with advisors in the two departments concerned and officially declare both majors on the appropriate form available in the Oxborough Student Services Center. A major field in Columbian School cannot be combined with a major field offered by another

degree-granting unit of the University. A student may pursue two majors at the same time, even though one is toward a B.A. and the other is toward a B.S.

Interdisciplinary Programs

Regular Interdisciplinary Programs—Programs include Archaeology, Early Modern European Studies, Environmental Studies, Judaic Studies, and Political Communication.

Special Interdisciplinary Programs—Students who find no existing major or program suited to their individual educational goals may propose a special interdisciplinary major program, in consultation with appropriate departmental advisors. Only programs with valid and clearly defined academic goals will be considered for approval.

Students with above-average records (a *B* average or better) are eligible for such programs. Normally, the proposed program of study must be submitted for approval by the end of the first semester of the junior year.

Approval of the proposed program rests with the Student Appeals Committee, which must also approve the proposed name of the program and the composition of the committee that will oversee it. At least 45 credit hours of the program must be completed in Columbian School. Because of the broad scope of an interdisciplinary program, it may not be part of a double major.

At the discretion of the committee overseeing the program, the student must either write an acceptable senior thesis or pass a comprehensive examination in the last semester of study toward the degree.

Program in the Liberal Arts—Directed by the Curriculum Committee of Columbian School, this program is designed to provide a general education in the liberal arts, with or without another major, as the student chooses. It offers opportunity for achieving a substantial acquaintance with each of the three divisions of knowledge through a selection of courses that cultivate a broad perspective in time and in national and/or cultural traditions. For curriculum requirements, see Liberal Arts, under Courses of Instruction.

Special Interdisciplinary Courses—Under the supervision of the Curriculum Committee, new courses combining the methods and insights of several disciplines are offered each semester. Interested students should consult the current *Schedule of Classes*, where such courses are numbered in the 700s.

Minors and Secondary Fields

Minors

Students who wish to familiarize themselves with a field outside their major may graduate with a minor in addition to the major. Not all Columbian School departments offer undergraduate minors; the requirements prescribed by those that do are listed under the department concerned. A student interested in a minor should consult a faculty advisor in the department concerned and declare both major and minor programs on the appropriate form available in the Cxborough Student Services Center.

At least one-half of the course work required for a minor must be done in residence. Grades of *C*− or better must be earned in 100-level courses, including such courses transferred as advanced standing from another institution. Courses passed with a grade below *C*− may be used to fulfill a minor field curricular requirement but may not be counted toward the total number of credit hours required for the minor.

When taken by a student enrolled at the University in a school other than Columbian School, such minors are designated secondary fields. The same curricular and scholarship requirements apply to secondary fields as to minors.

Undergraduates in other schools of the University may pursue major requirements to earn a secondary field when there is no appropriate minor.

Minors are available in the following fields:

Africana Studies
American Studies
Applied Ethics
Archaeology
Art History
Art History and Fine Arts
Biological Anthropology
Biology
Chemistry
Chinese Language and Literature
Classical Humanities
Communication
Creative Writing
Criminal Justice
Cross-Cultural Communication
Dance
Economics
Electronic Media
English
Fine Arts
French Language and Literature
General Anthropology
Geography
Geology
German Language and Literature
History
Human Services
Italian Language and Literature
Japanese Language and Literature
Jazz Studies
Journalism
Judaic Studies
Legal Assistant Program
Linguistics
Mathematics
Music
Peace Studies
Philosophy
Physics
Political Science
Psychology
Religion
Russian Language and Literature
Sociocultural Anthropology
Sociology
Spanish Language and Literature
Speech and Hearing
Statistics
Theatre
Women's Studies

Secondary Fields

Just as students enrolled at the University but outside the School may pursue Columbian School minors as secondary fields, such study is permitted Columbian School students in other schools of the University. Secondary fields are available in the School of Engineering and Applied Science, the School of Business and Public Management, and the Elliott School of International Affairs. Columbian School students are limited in the number of hours they may take in courses outside the School (so-called "professional credit" courses). Refer to the paragraph below.

Other Academic Regulations

Courses Outside Columbian School

Courses in schools of the University other than Columbian School may be taken to fulfill curriculum requirements, with approval of the major department. However, no more than 18 credit hours of such courses may count toward bachelor's degrees in Columbian School. (No credit toward the degree is allowed for exercise and sport activities courses.) Students who have extraordinary reasons for exceeding the 18-hour limit must receive prior approval from the dean. Pursuing a secondary field does not increase the 18-hour limit.

No more than 45 credit hours of courses completed by a student while in nondegree status in the Division of University Programs may be applied toward a degree in Columbian School.

Naval Science—For information on naval science courses and the Naval Reserve Officers Training Corps, see Naval Science, under Courses of Instruction. Note that not all Naval Science courses count toward the 120 credit hours required for the degree.

Service–Learning Program

A maximum of 15 credit hours in Service–Learning Program courses may be credited toward bachelor's degrees in Columbian School.

Earning an Additional Hour of Credit

Normally, no deviation is permitted from the number of hours of credit given in parentheses after the title of each course. In exceptional circumstances, however, and with the prior approval in writing of the instructor and the dean, a student may register for and earn an additional hour of credit in certain appropriate 100-level courses within the School by doing a significant amount of extra work as assigned and supervised by the instructor.

Pass/No Pass Option

A junior or senior student in Columbian School who is in good standing may, with the approval of the advisor and the dean, take one course a semester for a grade of *P*, Pass, or *NP*, No Pass. No student will be allowed to take more than four pass/no pass courses under this regulation. The student may, however, also receive grades of *P/NP* in proseminars for certain majors and in other courses normally using such grades. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the end of the eighth week of class. Courses required for the School's general curriculum requirements or in the student's major or minor field (including those courses required for the major that are offered by other departments) may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment in this University.

Tutorial Study

A junior or senior of demonstrated capacity, with a special interest in the subject matter of a regularly listed course, may be permitted to take tutorial study in residence under the personal direction of the instructor, in accordance with the rules of the appropriate department and with the approval of the dean. Credit under this plan is limited to the specific credit hours of credit designated for each course in the list of courses of instruction. It assumes frequent and regular conferences between the student and instructor.

Preparation for Medical School

A student who plans to apply to medical school fulfills the general requirements of Columbian School stated above and may select any major-field curriculum of any Columbian School department. Advice about academic preparation for medical school is provided by the Columbian School's Dean's Office. For admission to most medical schools, the student must have a minimum of 90 credit hours applicable toward a degree in an approved college of arts and sciences; the 90 hours must include:

Biology—8 credit hours, including laboratory. This may be either in general biology or zoology but may not include separately credited courses in botany.

Chemistry—8 credit hours of general inorganic chemistry (which may include qualitative analysis), including laboratory, and 8 credit hours of organic chemistry, including 2 hours of laboratory.

Physics—8 credit hours, including laboratory.

English—6 credit hours in the usual introductory English composition course or its equivalent.

Many medical schools have additional entrance requirements, which may include courses in biochemistry, genetics, and mathematics. Even when such courses are not required, they are strongly recommended.

With the exception of these specific requirements, applicants are urged to follow their personal interests in developing their course of study. A well-balanced program, rather than a specific field, is the criterion by which an applicant is judged. It is not advisable to take courses that appear to cover subject matter in the medical program. Although well-qualified candidates are eligible for admission after completing the minimum 90-credit-hour requirement, the majority of applicants are found to be better prepared for the study of medicine after four years of college work.

Preparation for Law School

Because a broad liberal education is the best undergraduate preparation for law school, Columbian School does not prescribe a prelegal curriculum. Advice about academic preparation for law school is provided by the Oxborough Student Services Center.

SCHOOL OF BUSINESS AND PUBLIC MANAGEMENT

Interim Dean J.E. Kee
Senior Associate Dean W.E. Seale
Associate Deans L.E. Graff, R.F. Dyer

Introduction

Organized as the School of Government in 1928, the School of Business and Public Management has been responsible for over half a century for the professional development of individuals assuming leadership roles in society. The School comprises eight departments—Accountancy, Finance, International Business, Management Science, Marketing, Public Administration, Strategic Management and Public Policy, and Tourism and Hospitality Management. The use of a multidisciplinary approach in educational programming helps prepare both the generalist and specialist for professional careers in today's complex, organizational society.

The School of Business and Public Management is a member of the American Assembly of Collegiate Schools of Business, and its Bachelor of Business Administration program is accredited by the Assembly.

Mission Statement—We believe that the creation and dissemination of knowledge is essential for effective management. Our mission is to serve current and future leaders, managers, and professionals in the global community by offering superior learning opportunities in business and public management; engaging in research and other scholarly activities to advance management theory and practice; and providing management and professional expertise to business, government, and not-for-profit organizations.

We are guided by our commitment to excellence in teaching and life-long learning; excellence in research and creation of new knowledge; meeting the distinctive needs of both part-time and full-time students; promotion of an entrepreneurial spirit; intellectual and professional development of faculty and staff; diversity in students, faculty, and staff; emphasis on the interaction of public-sector and private-sector organizations; and active engagement in the public discourse about the social and ethical responsibility of business.

As active and responsible citizens of our local community, the nation's capital, we acknowledge our reliance upon its wealth of resources and our commitment to help shape its future.

Regulations

See Admissions; Fees and Financial Regulations; University Regulations.

Attendance

A student may not attend classes until registration is completed. The student is held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up the work missed. A student suspended for any cause may not attend classes at GW during the period of suspension.

Leave of Absence and Continuous Enrollment

Students who wish to interrupt their studies must apply to the director of undergraduate advising and student services for either Continuous Enrollment or Leave of Absence (see University Regulations). If approved, either form of inactive status assures the student that, for at least one semester, re-entrance to the School may take place under regulations prevailing at the time of last registration. A student may re-apply for a second semester of either type of leave, but ordinarily such leave is only available for one calendar year. After two semesters of inactive status, the student is expected to resume active study toward a degree. All study toward a degree program at any other college or university, in this country or abroad, undertaken by a continuing student must be approved by the director in advance.

Adding and Dropping Courses

After registering, a student may add or drop courses only by means of procedures established by the Registrar. Failure to follow these procedures when dropping a course may result in a failing grade. The deadline for adding a course during the regular fall or spring semester is the end of the second week of classes.

The deadline for dropping a course without academic penalty is the end of the eighth week of classes in the fall and spring semesters. A course dropped during the first four weeks of classes will not appear on a student's transcript. A course dropped after the fourth week but before the end of the eighth week will be assigned the grade of *W* (authorized withdrawal).

The deadline for complete withdrawal from a student's entire program of courses without academic penalty is the end of the ninth week of classes.

After the deadlines, program changes are not possible unless the student presents a petition to the director of undergraduate advising and student services and receives permission.

Classification of Students

A student becomes a sophomore upon completion of 30 credit hours, a junior upon completion of 60 credit hours, and a senior upon completion of 90 credit hours. An unclassified student is one who is not a candidate for a bachelor's degree (normally because the student already holds one) but who wishes for valid academic reasons to take a limited program for a limited time. Students enrolled in five-year programs leading to both a B.B.A. and a master's degree are enrolled in courses at both the undergraduate and graduate levels during the final two years.

Independent Research Plan

A junior or senior of demonstrated capacity, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of an instructor, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific credit hours normally

allowed when a course is taken on a class basis. A petition outlining the student's specific study plan must be submitted to the director of undergraduate advising and student services prior to beginning any independent study. Generally, a maximum of two independent studies in two separate semesters is permitted.

Students from Other Schools Within the University

Degree candidates from other schools of the University cannot register for more than 18 hours of credit in courses from the Bachelor of Business Administration degree program. Typically, a maximum of 6 hours of credit is permitted in courses from the Bachelor of Accountancy program, unless an advisor recommends an additional 3 credit hours.

The Bachelor's Degrees

The School offers programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration. Programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration include foundation knowledge for business in accounting, behavioral science, economics, mathematics, and statistics. Curricula are designed to provide perspectives on ethical and global issues, the influence of political, social, legal and regulatory, environmental, and technological issues, and the impact of demographic diversity on organizations.

Several of the required core business courses are structured as modules lasting less than a full semester. This is done to increase program flexibility, while ensuring that key concepts are covered. Modules are scheduled so that students may have a uniform schedule throughout the semester.

A Bachelor of Business Administration student selects a field of concentration from among business economics and public policy, finance, human resources management, information systems, international business, marketing, tourism and hospitality management, or, with faculty approval, may choose to structure an individualized field of concentration reflecting the student's specific interests in management.

Entrance Requirements

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class include

1. An acceptable certificate of graduation from a U.S. secondary school. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics beyond introductory algebra.

International students may be considered for admission with an equivalent foreign secondary certificate. A student presenting a U.S. secondary certificate or its foreign equivalent must also show competence in the English language by scoring not less than 550 on the first taking of the TOEFL or 600 on the second taking. All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on the TOEFL will be exempted from this requirement. Depending on the results of this test, students may be required to enroll in a full-time program in English before beginning studies in a degree program.

2. Standardized test scores submitted on SAT I or ACT and on SAT II subject tests in writing, mathematics, and one other subject of the student's choice. Although no minimum scores are prescribed, test results are an important factor in determining admission eligibility.

Criteria for admission include a strong high school record and a satisfactory performance on the College Board examinations. It is recommended that the examinations be taken in December or January. Scores on tests taken in the junior year may be submitted.

American College Testing battery scores are also accepted. It is recommended that the applicant take the tests in October of the senior year.

Admission With Advanced Standing

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University, are as follows.

Any student newly admitted to the School of Business and Public Management who is from a country where English is not an official language must take an English as a Foreign Language placement test. Students do not have to take the placement test if they score 600 or higher on the TOEFL. A student failing to pass this examination will be required to complete successfully the appropriate English composition course or courses, and the assignment of credit for any previously completed courses at another institution will be held pending completion of this requirement.

Students who have accumulated fewer than 30 credit hours of transferable, relevant academic credit must have a minimum 2.8 cumulative grade-point average and meet freshman admission standards. Students who have accumulated 30 or more hours of transferable credit must have a cumulative grade-point average higher than 2.8. Advanced standing may be awarded for properly certified courses taken at regionally accredited colleges or universities for which the student received a grade of *C* or better. A maximum of 90 credit hours may be applied toward a degree, provided the credit is comparable to the curricular requirements of the degree. At least 27 credit hours in required business or accountancy courses must be completed while registered in the School of Business and Public Management. International students who have completed part or all of the English composition requirement, must take a validation examination through the English Department to determine if English advanced standing can be applied toward partial satisfaction of their GW degree requirements.

In no case will more than 60 credit hours of advanced standing be granted for course work completed at regionally accredited community or junior colleges. Certain courses (one course per area up to a maximum of three courses), comparable to this School's courses numbered 101–200, taken at a regionally accredited community or junior college with an earned grade of *C* or better, may be accepted for credit only after BAdm 197, Strategy Formulation and Implementation, is successfully completed with a grade of *C* or better in the senior year.

Although a grade of *D* is not acceptable for transfer of credit, the course may be used to waive a comparable curricular requirement. Credits earned with a *D* grade may not, however, be counted toward the total number of credit hours required for the degree. Any course completed with a grade of *D* or better may not be repeated for the purpose of earning degree credit. An exception to this rule is the freshman English composition requirement, Math 31 or 51 (or their equivalents), and all accountancy courses. Any student earning a *D* in such courses at another institution may be required to repeat the courses at this University.

All credit will be evaluated by the School, which reserves the right to refuse credit for transfer in whole or in part or to allow credit provisionally.

It is the responsibility of the student to have an official transcript sent directly from each institution formerly attended to the Office of Admissions, Rice Hall, The George Washington University, Washington, D.C. 20052.

A student wishing to transfer into the School from another division of this University must submit a formal application of transfer to the Office of Admissions in Rice Hall.

Courses taken in another degree-granting division of this University may be applied toward a degree in this School, provided they are comparable to the curricular requirements of the degree. A maximum of 90 credit hours of such credit may be applied toward a degree program in this School. However, in no case will more than 45 credit hours of undergraduate course work taken at this University in nondegree status be allowed toward meeting degree requirements in this School. Credit for correspondence or home-study courses will not be applied toward a degree in this School.

Degree Requirements

Academic Work Load

A full-time student in good standing (2.0 overall grade-point average or higher) may register for a maximum of 15 credit hours each semester and 6 hours each summer session. A student employed more than 20 hours a week, who is in good standing, may not take more than 9 credit hours each semester and 3 hours each summer session. A full-time student on probation may take no more than 12 credit hours of course work. It is strongly recommended that a student on probation not be employed.

A full-time student whose overall grade-point average is 3.5 or higher may take up to 18 credit hours. A student employed more than 20 hours a week, whose grade-point average is 3.5 or higher, may take up to 12 credit hours.

A student who accepts employment after registration or at any time during a semester must report immediately to the director of undergraduate advising and student services so that the program may be adjusted if necessary.

Exceptions to these rules require the approval of the director of undergraduate advising and student services.

Scholarship Requirements

A student must have the following to graduate: (1) an overall grade-point average of at least 2.0 and (2) a grade-point average of at least 2.0 in all required 100-level B.B.A. or B.Accy. courses and field-of-instruction–related courses. All courses taken at The George Washington University that are acceptable for credit toward the bachelor's degrees are to be included in the *overall grade-point average* calculation. Elective courses in or out of the School of Business and Public Management cannot be used as substitutes for required courses in the calculation of the *major field grade-point average*.

Dean's Honor List

The names of students who achieve a grade-point average of 3.5 or higher are placed on the Dean's Honor List for that semester. Appearance on the list is limited to (1) full-time students registered for a minimum of 12 credit hours (provided that the 12 hours are taken for a grade) and (2) part-time students registered for a minimum of 12 credit hours over a period of two consecutive semesters, which may include a summer term.

Incomplete/Authorized Withdrawal

Conditions under which the grades of *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described under University Regulations.

The grade of *I* must be changed by a date agreed on by the instructor and the student but no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of *I* is assigned. An Incomplete that is not changed within this period automatically becomes an *F*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the director of undergraduate advising and student services for additional time in which to

complete the work of the course. Such petitions should be submitted within the same period. The grade of *I* cannot be changed by reregistering for the course here or by taking its equivalent elsewhere. The *I* notation remains on the student's permanent record even after the course has been successfully completed.

The grade of *Z* (Unauthorized Withdrawal) is assigned when students are registered for a course they have not attended and in which they have done no substantial graded work. The grade of *Z* is not calculated in the overall and major field grade-point averages.

Semester Warning

Any student whose overall or major grade-point average falls between 2.0 and 2.2 will be placed on warning. Though the student's courses will not be restricted, progress during the semester will be monitored. Students are required to meet with an assigned advisor during the semester.

Mid-Semester Warning

If a professor files an evaluation showing that a student is doing unsatisfactory work (*C*– or below), the director of undergraduate advising and student services will inform the student in writing of his or her status. This notice constitutes an official direction to consult with the professor and advisor immediately.

Probation

A student whose grade-point average (either overall or in the major field) falls below 2.0 after completing a minimum of 12 credit hours of study will be placed on probation. Probation by overall grade-point average normally extends over the period in which the student attempts another 12 credit hours of work, which may include remedial studies as prescribed. In those cases in which a student chooses to take a lighter load during the probationary semester, performance will be reviewed at the end of the semester and the student may be suspended at that time. Incomplete grades are not allowed during the probation period. Probation by major field normally extends over the period in which the student attempts 6 credit hours of study in major field course work.

Suspension

A student whose grade-point average (either overall or in the major field) is 1.5 or below in any semester or remains below 2.0 at the end of the probationary period will be suspended. Any outstanding Incomplete grade at the time of suspension must be completed or will turn to an administrative *F*. A student suspended for poor scholarship may apply for readmission after the end of the fall or spring semester following the date of suspension. To be considered for readmission, the student must submit evidence of remedial activity performed during the suspension period and evidence of renewed potential ability to do college-level work. No advanced standing will be assigned for academic work completed while the student is suspended, but the student may petition the director of undergraduate advising and student services for consideration of advanced standing after completing a minimum of 12 credit hours of course work here and achieving a cumulative and major field grade-point average of at least 2.0.

A student readmitted after suspension is on probation (see above) and must maintain a current grade-point average determined by the director of undergraduate advising and student services until the cumulative and major field grade-point average are at least 2.0. In no case will the overall probationary period after readmission exceed 24 credit hours of study or the major field probationary period exceed 12 credit hours of study. A student suspended twice for poor scholarship will not be readmitted.

Pass/No Pass Option

A junior or senior student who has a cumulative grade-point average of 2.5 or better may, with the approval of the advisor and the director of undergraduate advising and student services, take one upper-level non-business elective a semester and receive a grade of *P*, Pass, or *NP*, No Pass, which will be recorded on the student's transcript but will not be reflected in the grade-point average. No student will be allowed to take more than four pass/no pass courses,with a limit of one per semester. A student must sign up for such an option at registration. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the last date to drop a course (except in the case of a prerequisite to Math 51). Required courses may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment in the University.

Grade of F

A grade of *F* earned in a required or elective course remains a part of the student's record and is calculated into the grade-point average.

Residence

A minimum of 30 credit hours, including at least 27 credit hours in required business or accountancy courses, must be completed while registered in the School of Business and Public Management. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Unless special permission is granted by the director of undergraduate advising and student services to pursue work elsewhere, the work of the senior or final year must be completed in the School of Business and Public Management. Students who have successfully completed 60 credit hours at GW may not take summer courses at a community college.

Earning Credit or Waiving Requirements by Examination

A student may earn credit up to a maximum of 30 credit hours or waive curricular requirements by performing satisfactorily on the following tests:

College-Level Examination Program (CLEP)—See Admissions for general information on the CLEP tests. CLEP tests in Introduction to Business, Commercial Law, and Data Processing are limited to 1.5 credits each of advanced standing. CLEP tests in general mathematics, college algebra/trigonometry, English composition, and more advanced courses in accounting and business administration are not accepted for advanced standing. Matriculated students who wish to receive credit for CLEP General and Subject Examinations must receive prior approval, through petition, of their advisor and the director of undergraduate advising and student services.

Advanced Placement Tests and Achievement Tests—See Admissions.

Special Departmental Examinations—A student may request any department of Columbian School to offer a special examination covering the subject matter of any specific course. (If an appropriate CLEP Subject Examination is available, the department may choose to employ it.) The student must offer evidence of sufficient background to have a reasonable command of the subject matter. Departments reserve the right to deny such requests. Credit by special departmental examination is not permitted for the first two years of college-level courses in a native language other than English. A student who has previously taken examinations to waive course requirements may not subsequently take examinations for credit in the same courses. Assigning credit (or waiving a requirement) by special departmental examinations will depend on the department's evaluation of the examination paper. These examinations will normally be of at least three hours' duration. A fee for each course examination is charged for preparation, administration, and grading of the examination. A petition

must be submitted to the director of undergraduate advising and student services prior to taking the examination.

Waiving Introductory Courses by Examination—Several departments in Columbian School, including English, history, and sociology, offer periodic waiver examinations for introductory courses. Such examinations may be attempted at the option of the student; a fee is charged. Specific departments should be consulted for further details. Passing a waiver examination does not entitle a student to any credit toward the degree.

The Bachelor of Accountancy

The principal objective of the Bachelor of Accountancy degree is preparation for a professional career in accounting. Professional preparation requires specialization in accounting knowledge as well as a general education in English, humanities, social sciences, mathematics, and sciences. An additional objective is the preparation of students for a fifth-year or Master of Accountancy program that is intended to meet the academic needs of students seeking professional accounting careers in the public or private sector, which demand high entry-level academic achievement.

One hundred twenty credit hours are required for graduation. To be accepted in the Bachelor of Accountancy program a cumulative grade-point average of 2.5 or higher is required at the start of the junior year. Courses must be taken in accordance with the academic status of the student (i.e., freshman, sophomore, junior, senior) and the course prerequisites. Math 3, 6, 9, 10, and 20 may not be used for credit toward the Bachelor of Accountancy.

Curriculum for the Pre-Accountancy Program

Freshman Year—Econ 11–12; Engl 9 or 10, 11; Math 31–32 or 51–52; PSc 2; Soc 1; a two-course sequence chosen from Astr 1–2, BiSc 3–4, Chem 3–4, Geol 1–2.

Sophomore Year—Accy 51, 121; BAdm 53, 54; Econ 121; Psyc 1 and one Psyc elective; Phil 45 or 51, and 135; Stat 51; Comm 42.

Curriculum for the Accountancy Program

Junior Year—Accy 101, 122, 151, 152 or 162, 161, 191; BAdm 110, 115, 120; Engl 102.

Senior Year—Accy 132, 171, 181; Mgt 107 or 110 or Psyc 144; BAdm 150, 197 (BAdm 197 must be taken at GW); Stat 103; one 3-credit 100-level elective chosen from the Department of International Business; one 3-credit 100-level elective chosen from the School of Business and Public Management; one 3-credit 100-level elective chosen from among University offerings.

The Bachelor of Business Administration

One hundred twenty credit hours of course work are required for graduation. To be recommended by the Faculty for graduation, candidates are required to complete, in addition to the appropriate freshman and sophomore work, a minimum of 60 credit hours of course work in the junior and senior years, including the required course work in one of the fields of concentration offered by the School. Courses must be taken in accordance with the academic status of the student (i.e., freshman, sophomore, junior, senior) and the course prerequisites. The field of concentration must be selected no later than the first semester of the junior year. Electives in the junior and senior years are restricted to appropriate 100-level courses chosen in consultation with the advisor. Math 3, 6, 9, 10, and 20 may not be used for credit toward the B.B.A. degree. If the student places in the first semester of a language previously studied in high school, credit toward the degree will not be granted; however, the second semester of a first-year language course that was studied in high school may be taken as a sophomore elective.

Incoming freshmen may choose a B.B.A. program in international business with a world area focus on Latin America, the Pacific Rim, or Europe. Students in these programs take the same business core requirements as all other B.B.A. students. Their interest in a particular world area, however, is enhanced through a selection of general education requirements and electives that provide historical and cultural background on that area of the world and a language proficiency requirement in a language relevant to the focus area. A student may need to take an additional 4 to 10 hours over and above the 120 hours for the standard program in order to complete this international program. Interested students should speak to an advisor in the Office of Undergraduate Advising and Student Services.

Curriculum for the First Two Years for All B.B.A. Students

Freshman Year—Econ 11–12; Engl 9 or 10, 11; Math 31–32 or 51–52; a two-course sequence chosen from Astr 1–2; BiSc 3–4 or 11–12, Chem 3–4 or 11–12, Geol 1–2, Phys 1–2; Psyc 1 or 12; one approved elective focusing on a culture or political system other than one's own.

Sophomore Year—BAdm 51, 52, 53, 54, 55, and 56; Stat 51 or 53; one approved elective selected with advisor approval to improve communication skills; one course from among Anth 150; Phil 131, 132, or 135; Rel 121, 122, or 123; or WStu 125; three approved electives chosen outside of accountancy, economics, finance, international business, management science, strategic management and public policy, marketing, and tourism studies, at least one of which is in the humanities.

Curriculum for the Second Two Years for All B.B.A. Students

The Bachelor of Business Administration program is designed to provide the broad foundation required for eventual leadership in either business or governmental administration. The business administration major consists of 30 credit hours of required upper-level business administration courses and 15 hours of required field-related courses. These are included in the calculation of the major grade-point average.

Junior Year—BAdm 110, 115, 120, 125, 130, 140; one course chosen from among Comm 121 or 150; Econ 121, 123, 181, or 182; Geog 120; Math 101 or 105; Mgt 119; Mktg 142, 143; OR 101; Phil 135; PSc 101; SMPP 192; or Stat 105, 111, 118; one course chosen in the field of concentration; two approved 3-credit 100-level electives chosen outside of accountancy, economics, finance, international business, management science, strategic management and public policy, marketing, and tourism studies; one 3-credit course chosen from among University offerings.

Senior Year—BAdm 145, 150, 197, and a section of BAdm 190 approved by the advisor; three courses selected from the field of concentration; one field-related elective; two approved 3-credit 100-level liberal arts electives chosen outside of accountancy, economics, finance, international business, management science, marketing, and strategic management and public policy; one approved 3-credit course chosen from among University offerings.

Fields of Concentration

The field of concentration consists of four field courses and an elective designated by field faculty. The field of concentration must be selected no later than the first semester of the junior year. The student should contact the Office of Undergraduate Advising and Student Services to declare a field. In addition to maintaining the current advisor, the student is assigned a faculty mentor. Fields are described below (an asterisk indicates that the course is required for the field).

Business Economics and Public Policy—This field is directed toward developing understanding and skills applicable to a wide variety of positions in business and public-sector organizations. The social, legal, political, and economic environment of business and the micro- and macroeconomic foundations of governmental programs and regulatory activity are studied to establish a basis for developing and evaluating effective business responses. The program is concerned with the continuing business–government dialogue on effective and equitable relations between these two sectors of society.

The following courses provide a basic academic foundation in the field of business economics and public policy: Mgt 117; IBus 171; Econ 101,* 102,* 136, 158, 159, 161, 162, 181–82; Hist 179; PSc 116, 117, 118, 122; PAd 125; Soc 168. The field-related elective must be chosen from IBus 160 or PSc 104.

Finance—The B.B.A. with a concentration in finance provides students with the analytical tools and a theoretical framework necessary to make financial decisions. Students cover three interrelated areas: money and capital markets (interest rates and banking); investments (stocks, bonds, and derivative contracts); and financial management (capital investment funding, and dividend decisions). Students are enabled to develop the skills required for entry-level employment in corporations, financial institutions, and the public sector. The field also provides an excellent foundation for graduate work in business, economics, and law.

The following courses provide a basic academic foundation in the field of finance: Fina 122,* 123,* 124,* and either 132 or 135. The field-related elective must be chosen from Accy 111, 121, 161; Econ 121, 123, 181; IBus 171, 173.

Human Resource Management—This field is concerned with all aspects of the employment of human resources in business organizations. Entry-level career opportunities are in such fields as personnel management, employee relations, collective bargaining, and manpower utilization. The field offers increasing professional opportunities in a post-industrial society, where the costs of employees are increasing, the expectations of people are expanding and becoming more diverse, and the regulatory environment is becoming more complex. Since the field focuses on the management of human resources in a general sense, it also prepares the student for responsibilities associated with general management and leadership.

The following courses provide a basic academic foundation in the field of human resource management: Mgt 115,* 117,* and two courses from among Comm 120, 150, or 170; Econ 165; Psyc 131; or Phil 125. The field-related elective must be chosen from IBus 160, PAd 125, or Mgt 119 or 192.

Information Systems—Students taking this field develop a firm foundation in the use of the computer as a tool in solving information problems in organizations and are recruited by public and private sector organizations for positions as programmer/analysts and systems designers. These entry-level positions lead to careers in the marketing of computer hardware and software, systems consulting, and management.

The following courses provide a basic academic foundation in the field of information systems: Mgt 119,* 120,* 121,* 122, 244 (with permission of field advisor by formal petition). The field-related elective must be chosen from Mgt 107, 110, 115; Stat 130, 131; or other courses with permission of faculty advisor.

International Business—This field provides the basic academic foundations for entry-level positions in international business, particularly in multinational corporations, international banks, and government agencies. Such organizations include the Departments of Commerce, State, and Treasury, plus international institutions such as the Export–Import Bank, World Bank, and Overseas

Private Investment Corporation. Students in this field are encouraged to include two years of a modern foreign language in their preparatory background.

The following courses provide a basic academic foundation in the field of international business: IBus 160,* 166,* and 171;* one course from among IBus 168, 173, or 175. The field-related elective must be chosen from Accy 121; Econ 151, 181, 182; Fina 123; Mktg 142, 143, 148; Stat 118.

Marketing—This field provides understanding of complex and changing environments and their effects on marketing activities and institutions; dynamics of buyer behavior; demand, market segments, and cost–volume profit relationships of marketing programs; and skills in formulating and implementing comprehensive marketing plans. Typical entry-level positions are advertising account executives, marketing research project managers, retail assistant buyers, and sales representatives for consumer or industrial products firms.

The following courses provide a basic academic foundation in the field of marketing: Mktg 142,* 143,* 150,* 159.* The field-related elective must be chosen from AmSt 167; Comm 150; Geog 145; IBus 160, 166, 168; Jour 145; TStd 145.

Tourism and Hospitality Management—This field provides an understanding of the tourism and hospitality industry, including its organizational stucture, service systems, communication and transportation linkages, legal and regulatory environment, financial aspects, and operational requirements, with an international emphasis on strategic management and marketing approaches. Students are encouraged to take two years of a modern foreign language and to learn more about a specific region of the world related to their particular career interest. Typical entry-level positions include those with hotels and resorts, restaurants and food service operations, visitor and convention bureaus, theme parks and recreation centers, tour operators, travel management firms, and event managers.

The following courses provide a basic academic foundation in the field of tourism and hospitality management: TStd 104,* 143,* 144,* and 145.* The field-related elective must be chosen from Mktg 142 or 143.

Individualized Field of Concentration

A student with a specific interest in some field of management may design an individualized field of concentration drawing on courses across the University. Past examples of approved individualized fields include sport management, media management, and arts management. Such a concentration consists of four courses plus a field elective selected with the guidance of faculty with expertise in the area of interest. All such individualized fields must be approved in advance through the School's Office of Undergraduate Programs. Interested students should discuss their ideas with an advisor.

Secondary Field of Study

A secondary field of study in business administration is available in the School of Business and Public Management; SBPM students may pursue a secondary field in other GW schools. See the brochure "Secondary Fields of Study," available in the Office of Undergraduate Advising and Student Services.

Five-Year Programs Leading to a B.B.A. and a Master's Degree

The School of Business and Public Management offers five-year programs leading to both a B.B.A. and a master's degree. In each case, the student is admitted to the graduate program in the fourth year of study, after completion of 90 credit hours. During the last two years, the student simultaneously completes requirements for the undergraduate and the graduate degree but is not considered

a graduate student until the start of the fifth year of study. Students who choose to discontinue the program at the end of four years will be required to take additional courses to complete requirements for the B.B.A. A full description of the programs can be obtained through the Office of Undergraduate Advising and Student Services.

Bachelor of Business Administration/Master of Public Administration

A student may apply for admission to the Master of Public Administration after completion of 75 credit hours. Upon acceptance, during the fourth and fifth year of study, the student works simultaneously toward both degree programs; both the Bachelor of Business Administration and the Master of Public Administration are awarded at the successful conclusion of the five years of study.

Curriculum requirements in the first six semesters are identical to those of the B.B.A. degree. Students take PAd 125 among the third-year choices.

Fourth Year—BAdm 145, 150, 197; a section of BAdm 190 approved by the advisor; PAd 201, 202, 203, 207; electives as required.

Fifth Year—PAd 204, 205, 206, 208, 209; three courses in one of the following fields of concentration: budget and public finance; federal policy, politics, and management; managing in public organizations; managing state and local governments; policy analysis and evaluation; two elective courses in Public Administration.

Bachelor of Business Administration/Master of Science in Information Systems

After completion of 75 credit hours, a student may apply for admission to the Master of Science in Information Systems with a field of concentration in information systems development. Upon acceptance, the student works simultaneously toward both degree programs; the Bachelor of Business Administration and Master of Science in Information Systems are awarded at the successful conclusion of five years of study.

Curriculum requirements in the first six semesters are identical to those of the B.B.A. degree. Students take Mgt 119 and 121 among the third-year choices.

Fourth Year—BAdm 145, 150, 197; a section of BAdm 190 approved by the advisor; two upper-level non-business electives; Mgt 120, 280, 284, 285; one graduate elective selected with advisor approval.

Fifth Year—Mgt 282, 283, 286, 287, 288, 298; one elective.

Bachelor of Business Administration/Master of Tourism Administration

After completion of 75 credit hours, the student may apply for admission to the Master of Tourism Administration. Upon acceptance, during the fourth and fifth years of study, the student builds upon the business core to develop expertise in tourism administration. Students choose one of four established concentrations or, with faculty approval, design an individualized field at the master's level to suit a specific career objective. Students are required to gain at least 500 hours of work experience in the tourism and hospitality field if they do not have equivalent previous experience.

Curriculum requirements in the first six semesters are identical to those of the B.B.A. degree. Students take TStd 104 and 143 among the third-year choices.

Fourth Year—BAdm 145, 150, 197; a section of BAdm 190 approved by the advisor; TStd 144, 145, 249, 250; two upper-level nonbusiness electives.

Fifth Year—Mktg 243, TStd 270, 283, and 297 or 299 and 300, and six courses in one of the following concentration fields: destination management, travel marketing, event management, sport management, or the individualized study option.

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Interim Dean T.A. Mazzuchi
Interim Associate Deans R.S. Heller, S. Sarkani

Introduction

The School of Engineering and Applied Science was organized in 1884 as the Corcoran Scientific School of Columbian University. It was named in honor of William W. Corcoran, president of the University's Board of Trustees from 1869 to 1888. The school was among the first to accept women for degree candidacy in engineering. The organization and offerings of the school have evolved over the years, but throughout most of its history the program has been characterized by its emphasis on the principles guiding the advancement of technology.

Through its four departments—Civil, Mechanical, and Environmental Engineering; Electrical Engineering and Computer Science; Engineering Management; and Operations Research—the School of Engineering and Applied Science offers undergraduate study leading to the degrees of Bachelor of Science (Civil Engineering), Bachelor of Science (Computer Engineering), Bachelor of Science (Computer Science), Bachelor of Science (Electrical Engineering), Bachelor of Science (Mechanical Engineering), and Bachelor of Science (Systems Analysis and Engineering). Five-year bachelor's/master's degree programs are available for selected majors. In cooperation with the Law School, an integrated engineering and law program leading to the degrees of Bachelor of Science and Juris Doctor is offered. An integrated engineering and medicine program leading to the degrees of Bachelor of Science and Doctor of Medicine is offered in cooperation with the School of Medicine and Health Sciences. The School offers graduate study leading to the degrees of Master of Science, Master of Engineering Management, and Doctor of Science and to the professional degrees of Engineer and Applied Scientist.

The School of Engineering and Applied Science maintains extensive and varied computing facilities as well as an array of laboratory facilities to support study and research in such areas as general-purpose electronics, computer science, computer engineering, graphics, computer-aided design, robotics and computer-aided manufacturing, computer-aided engineering, artificial intelligence/software engineering, decision support systems, interactive multimedia, power systems, control systems, medical engineering, combustion diagnostics, fluid mechanics and hydraulics, environmental engineering, propulsion, soil mechanics, thermal sciences and instrumentation, materials science and engineering, thin-film development, and communications, microwaves, and lasers.

Entrance Requirements

Requirements for admission are as follows:

1. An acceptable certificate of graduation from an accredited secondary school. The program must include four years of English; four years of mathematics, including two years of algebra, one year of plane geometry, one-half year of trigonometry, and one-half year of precalculus, analytic geometry, or functions; one year each of physics and chemistry (general science courses do not satisfy this requirement); and two years of history or a foreign language. Applicants who do not meet all of these requirements may be admitted to a prescribed program that includes courses to make up the deficiencies.
2. Standardized test scores on SAT I or ACT. Although no minimum scores are prescribed, test results are considered in determining admission eligibility. SAT II subject tests in writing and mathematics are recommended.
3. Additional requirements for students from foreign institutions are described under Admissions.

Transfer Students

To be considered for admission as a transfer student, an applicant must be in good standing as to scholarship and conduct at all postsecondary institutions previously attended and should have a minimum grade-point average of 2.7 on a 4.0 scale. A student who has been academically dismissed will not normally be considered for admission.

When no duplication is involved, either through course work or examination, transfer credit may be granted for work successfully completed at other accredited institutions of higher learning prior to enrolling at GW. Credit will be granted only when such work meets the requirements for the degree sought at this University. Courses graded *D+*, or the equivalent, or lower will not be considered for transfer.

Although there is no strict limit to the total amount of transfer credit that may be assigned, a student must satisfy the 30-credit-hour residence requirement and course requirements for the degree sought at George Washington University. Students should complete a Transfer of Credit worksheet, available in the SEAS Office of Admissions and Student Records, and present the worksheet to the faculty advisor for approval.

Admission with Advanced Standing

Credit by Examination

Assuming there is no duplication of course work, a maximum of 30 credit hours may be assigned upon admission to the University for any combination of the following.

College Board Advanced Placement (AP) Tests—See Admissions.

College Board College-Level Examination Program (CLEP)—See Admissions. A student already registered at the University must seek departmental approval before taking a CLEP Subject Examination for credit. Credit may not be earned by passing the examination after having taken the equivalent course or after having taken a waiver examination for the course.

Department Examinations for Waiver or Credit—Registered SEAS students may also take examinations in some academic departments for waiver of or credit for a specific course upon approval of the appropriate department chair; before the test is administered, the student must have demonstrated sufficient preparation to warrant being given the test. An examination for credit is not allowed if an examination for waiver has been successfully completed or if the student has taken the course.

Makeup of Credit for Waived Courses

Waiver of a required course requires approval of the student's faculty advisor and curriculum coordinator. If a course required by the SEAS curriculum is waived, the corresponding credit hours must be earned by satisfactory completion of a university-level academic course, either technical or nontechnical, approved by the student's faculty advisor. If the substituted course would normally be considered part of the student's curriculum, the grade earned will be used in determining grade-point average, Dean's List, probation, and suspension. If the substituted course would not be part of the student's curriculum, the grade will not be included in the above computations.

Credit from Service Schools

A limited amount of credit may be assigned for selected service school courses.

Regulations

See Admissions; Fees and Financial Regulations; University Regulations.

Attendance

Students are held responsible for completing all of the work of the courses in which they are registered, and all absences must be excused by the instructor before provision is made to make up the work missed. A student suspended for any cause may not attend classes during the period of suspension.

Academic Work Load

A full-time undergraduate student who is not on probation may register for no more than 21 credit hours. Students on probation may not register for more than 12 credit hours. A student employed more than 24 hours a week may take no more than 10 credit hours. In exceptional cases these limits may be exceeded with the advisor's permission.

Adding and Dropping Courses

After registering, a student may add or drop courses only by means of procedures established by the registrar. Failure to follow these procedures when dropping a course may result in a failing grade.

The signature of the faculty advisor is required to add or drop a course. Requests for changes in class registration must be made on a registration transaction form, available in the SEAS Office of Admissions and Student Records. The deadline for adding a course during the regular fall or spring semester is the end of the second week of classes. Thereafter, the signature of the associate dean for academic affairs is required.

The deadline for dropping a course without academic penalty is the end of the fourth week of classes in the fall and spring semesters. Thereafter, the only adjustment permitted is withdrawal. A course dropped during the first four weeks of classes will not appear on a student's transcript. After that period the grade of *W* (Authorized Withdrawal) will be assigned.

Students may withdraw from courses (or change to Audit) without academic penalty up to the end of the ninth week of classes in the fall and spring semesters. In unusual circumstances, if a student desires to withdraw from a course after the authorized withdrawal deadline, the student should first present documented evidence of extenuating circumstances to the department chair and then to the associate dean for academic affairs. In all cases, financial regulations governing withdrawal remain in full effect.

Scholarship Requirements

To be eligible for graduation a student must have (1) a grade-point average of at least 2.2 for technical courses taken in the fifth through eighth semesters of the curriculum and (2) a 2.0 overall average for the program taken at SEAS. Grades used to calculate the grade-point average include all grades earned at George Washington University and through the Consortium universities while the student is enrolled at GW. The grades used are for academic courses taken in fulfillment of degree requirements and not for remedial courses or those taken to make up deficiencies. (For example, EFL courses numbered 45 and below will not be considered for purposes of probation, suspension, or Dean's List.)

Non-SEAS courses taken in excess of the number needed to fulfill degree requirements are not considered in determining probation, suspension, or Dean's List status. Only courses required for the degree program are considered in determining whether the student has met graduation requirements.

Probation

A full-time student will be placed on probation if his or her grade-point average is less than 2.0 for one semester or if he or she receives more than one grade

of *F* in one semester or summer session. A part-time student will be placed on probation if his or her grade-point average is less than 2.0 or he or she has received more than one grade of *F* when he or she has accumulated 12 credit hours. For academic purposes, a new grading period will begin once this accumulation is reached.

A student on probation who earns a grade-point average of 2.0 or better (for 12 or more credit hours) during the semester on probation but also receives a grade of *F* will be continued on probation; students in this category who receive two or more *F*s will be suspended.

A full-time student will be removed from probation when the grade-point average is 2.0 or more with no grade of *F* during the semester on probation. A part-time student will be removed from probation when the grade-point average is 2.0 or more and he or she receives no grade of *F* for the next 12 credit hours after being placed on probation.

Suspension

The following cases constitute grounds for suspension: (1) receipt of two grades of *F* any time during a probation period (part-time students receiving two grades of *F* while on probation will be suspended at the time of receipt of the second of these grades); (2) receipt of four grades of *F* in any semester (or the equivalent for part-time students); (3) placement on probation for a third time; (4) accumulation of a grade-point average of (a) 1.5 or less at the end of the sophomore year or upon completion of the 63rd credit in the student's curriculum, (b) 1.9 or less at the end of the junior year or upon completion of the 97th credit in the student's curriculum, or (c) less than 2.0 at any time during the senior year.

Department faculty may designate additional courses to be taken and grades to be received by students who fail to meet but come close to meeting the graduation requirements. Suspension may be held in abeyance until the conditions are or are not met.

Students readmitted on probation will be suspended if they do not attain a minimum grade-point average of 2.0 during their first semester (12 or more credit hours) or if they receive more than one grade of *F* during the period.

Once suspended, a student may not have that suspension rescinded by a grade change at a later date. The student may, however, apply for readmission noting the grade change. Students who have been suspended may not apply for readmission until one year after the suspension. To be considered for readmission, a student must have undertaken academic work at another institution, primarily in mathematics, science, or engineering, during the year of suspension and earned a grade-point average of at least 2.7.

Dean's Honors and Commendation Lists

The names of all students who, in a given semester, take 12 or more graded credit hours in course work that applies to graduation requirements (or in any additional SEAS courses taken) may appear on the Dean's Honor List if a grade-point average of 3.5 is achieved or on the Dean's Commendation List if a grade-point average of 3.0 is achieved. No disciplinary action may have been taken against the student, and no more than one grade below *B*− and no grades below *C*− may have been earned. A student who receives a grade of *I* (Incomplete) during a semester will not be placed on the Dean's Honors or Commendation List for that semester unless the *I* is removed no later than 30 days after the end of the marking period and the student continues to meet all the requirements for the Dean's Honors or Commendation List.

Incompletes

Conditions under which the grade of *I* (Incomplete) may be assigned are described under University Regulations. If a grade of *I* is not changed to a letter

grade within 30 days, decisions on probation, removal from probation, and suspension will be made with the information on hand, in conformance with SEAS regulations.

Although the grade of *I* may remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination or required paper) must be made up. The grade of *I* cannot be removed by the student's reregistering for the course here or taking its equivalent elsewhere. A grade of *I* that is not removed after one calendar year or at the time of graduation of the student, whichever occurs first, will be changed on the permanent record to a grade of *IF*. When the *I* is changed to a letter grade, the grade of *I* followed by the letter grade (e.g., *IB*) will appear on the student's record. The grade to which the *I* is changed will be applied to the grade report for the semester or summer session during which the change is made for the purposes of determining probation, suspension, grade-point average, and Dean's and other honor lists.

Pass/No Pass Grading System

SEAS students may not take courses required for graduation on the pass/no pass (*P/NP*) grading system. They may, however, take courses outside their regular SEAS academic program under this grading system.

Students whose status of probation or suspension depends on a grade of *P* are given 30 days to have the grade changed. If not changed by the end of that period, the *P* will be considered a *C* for probation, suspension, Dean's List, and graduation purposes, and a grade of *NP* will be considered an *F*.

General Curriculum Requirements

Bachelor of Science programs require the following number of credit hours for completion of the degree—civil engineering, 129; computer engineering, 130; computer science, 125; electrical engineering, 128; mechanical engineering, 129; systems analysis and engineering, 129; medical preparation options in civil engineering, electrical engineering, mechanical engineering, and systems analysis and engineering, 137; medical preparation option in computer science, 133; the environmental engineering option, 127.

Thirty hours must be completed in residence. Full-time students normally complete their programs in four years. The core curriculum—the program of the first four semesters—provides the base of scientific principles and mathematical techniques necessary for the professional courses taken in the last four semesters.

Advisory System

Every entering undergraduate student is assigned a faculty advisor to assist in orientation in the professional discipline. Faculty advisors counsel students on their programs of study, achievement and maintenance of satisfactory scholastic performance, professional development, and extracurricular activity as part of the educational process. The advisor represents the student in all cases requiring faculty action.

Students must obtain their advisors' approval of programs of study prior to registration for each academic semester and summer session. Until the work required for the degree is completed, students must consult with their advisors in all academic matters. However, an advisor may not deny entry into any course or activity to which the student is entitled under the regulations of the School.

Courses in the Humanities and Social Sciences

With the assistance of the advisor, each engineering student prepares a program of elective courses in the humanities and social sciences. The program must

include a minimum of 18 credit hours, divided equally between the humanities and social sciences. Each 9-hour group must include two courses in one subject area and a third course in a different subject area. When a foreign language is taken as part of the humanities requirement, the following rules apply: (1) the foreign language studied must not be a native language of the student, unless the courses taken are literature courses; (2) if the student has studied the language previously, he or she must first take a placement test given by the language department concerned and enroll in a course recommended by that department; and (3) the student may use at most two foreign language courses to satisfy SEAS's humanities requirements. If two courses are used, they must be in the same foreign language. The advisor and the curriculum coordinator must approve the program.

Since the SEAS curricula are, by necessity, oriented toward technical subjects, the program in the humanities and social sciences should consist of courses that broaden the student's outlook. Courses in areas such as anthropology, economics, foreign languages, geography, history, literature, philosophy, political science, psychology, and sociology are considered appropriate.

Because most medical schools expect applicants to have completed 6 credit hours of English composition, students following one of the medical preparation options are advised to choose humanities electives with extensive writing requirements.

Civil Engineering

Civil engineering encompasses those branches of engineering most closely related to the control and improvement of our environment and of the physical conditions of life. Civil engineers apply many technical specialties in order to plan, design, and construct projects that range from buildings and transportation systems to space stations and space habitats.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 50; EngS 4; Math 32; Phys 41; humanities or social sciences elective.

Third Semester—ApSc 57, 113; Math 33; Phys 42; humanities or social sciences elective.

Fourth Semester—ApSc 58, 115, 130; CE 120; humanities or social sciences electives (6 hours).

Fifth Semester—CE 117, 121, 166, 167; ME 126, 131; humanities or social sciences elective.

Sixth Semester—CE 122, 188, 192, 193, 194; Geol 1.

Seventh Semester—CE 168, 185, 189, 191, 195, 197; technical elective selected from list below.

Eighth Semester—CE 190, 196, 206; technical elective; design elective.

Technical Electives—ApSc 199; CE 198, 201, 202, 203, 204, 205, 208, 210, 212, 213, 214, 216, 219, 220, 223, 240, 241, 243, 254, 255, 282, 284; EMgt 160; EngS 215, 231, 234, 237, 241, 242, 282, 284, 285.

Design Electives—CE 201, 202, 203, 213, 214, 221, 237.

Environmental Engineering Option in Civil Engineering

The environmental engineering option leads to a bachelor's degree in civil engineering. Students are prepared to work in technical environmental fields such as hazardous waste treatment, environmental impact assessment, and water resources engineering. Students are also prepared to pursue graduate study in environmental engineering.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 50; EngS 4; Math 32; Chem 12; Phys 41.

Third Semester—ApSc 57, 113; Math 33; Phys 42; humanities or social sciences elective.

Fourth Semester—ApSc 58, 130; CE 120; humanities or social sciences electives (6 hours).

Fifth Semester—ApSc 115; Chem 105; CE 117, 121; ME 126; humanities or social sciences elective.

Sixth Semester—CE 122, 188, 192, 193, 194; humanities or social sciences elective.

Seventh Semester—CE 168, 185, 189, 191, 195, 197; technical elective.

Eighth Semester—CE 190, 196, 237; technical elective; design elective.

Technical Electives—ApSc 199; CE 198, 205, 211, 212, 213, 214, 216, 219, 240, 241, 243, 272, 273, 276, 277, 278, 279, 281, 282, 283, 284.

Design Electives—CE 213, 214, 273, 277.

Medical Preparation Option in Civil Engineering

The medical preparation option in civil engineering leads to a bachelor's degree in civil engineering and prepares the student for application to medical school. The student is also prepared to work in research and development or to pursue graduate study in the fields of biomechanics and biotechnology. Students pursuing medical preparation and applying to medical school should consult the SEAS representative to the University's premedical committee.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 50; EngS 4; Chem 12; Math 32; Phys 41.

Third Semester—ApSc 57, 113; BiSc 11; Math 33; Phys 42; humanities or social sciences elective.

Fourth Semester—ApSc 58, 130; BiSc 12; CE 120; EE 11; humanities or social sciences elective.

Fifth Semester—CE 117, 121, 166, 167; ME 126, 131; Chem 151, 153.

Sixth Semester—CE 122, 188, 192, 193, 194; Chem 152, 154.

Seventh Semester—CE 168, 185, 189, 191, 197; humanities or social sciences electives (6 hours).

Eighth Semester—ApSc 115; CE 190, 196, 206; humanities or social sciences elective.

Computer Engineering

Computer engineering combines electronic design, programming of computers, and mathematics. Students are prepared to design hardware and software for microcomputers and large-scale computing systems and to design computer hardware and software for control of large systems.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 51; Math 32; Phys 41; humanities or social sciences electives (6 hours).

Third Semester—ApSc 113; CSci 131; EE 11, 63; Math 33; Phys 42.

Fourth Semester—ApSc 114, 130; CSci 60, 120; EE 12, 20, 65.

Fifth Semester—ApSc 115; CSci 133, 140; EE 30, 66, 67, 122.

Sixth Semester—CSci 110, 144, 156, 162, 165, 172.

Seventh Semester—CSci 163, 166, 182; EE 126, 143; humanities or social sciences elective.

Eighth Semester—CSci 164, 167, 188; EE 128; humanities or social sciences electives (6 hours).

Computer Science

The program combines systems design, computer programming, and mathematics to provide a broad background in the disciplines that underlie computer science. Students are prepared to design and implement the software needed for large computing systems and microprocessor-based systems.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 51; Math 32; Phys 41; humanities or social sciences electives (6 hours).

Third Semester—ApSc 113; CSci 131, 133; Math 33; Phys 42.

Fourth Semester—CSci 60, 110, 120, 142, 144; science elective.

Fifth Semester—ApSc 115; CSci 140, 145, 148, 152; Engl 110.

Sixth Semester—CSci 146, 156, 172, 175; humanities or social sciences elective; free elective.

Seventh Semester—CSci 163; humanities or social sciences elective; non-technical elective; computer science elective; free elective.

Eighth Semester—CSci 164; humanities or social sciences elective; non-technical elective; computer science elective; free elective.

Technical Electives—CSci 134, 155, 168, 174, 178, 182, 185, 187, 188, 190, and approved graduate computer science courses.

Medical Preparation Option in Computer Science

The medical preparation option permits the student to obtain a bachelor's degree in computer science and have sufficient preparation to apply to medical school. The student is also prepared to conduct research toward development of electronic equipment to assist the medical profession in diagnosing and treating disease, or to continue as a graduate student in engineering and science with exceptional qualifications for medical engineering. Students pursuing medical preparation and applying to medical school should consult the SEAS representative to the University's premedical committee.

First Semester—Chem 11; Engl 9 or 10; EngS 1; Math 31; humanities or social sciences elective.

Second Semester—Chem 12; CSci 51; Math 32; Phys 41; humanities or social sciences elective.

Third Semester—BiSc 11; CSci 131, 133; Math 33; Phys 42.

Fourth Semester—BiSc 12; CSci 60, 110, 120, 142, 144.

Fifth Semester—Chem 151, 153; CSci 140, 145, 148, 152; Engl 110.

Sixth Semester—ApSc 113; Chem 152, 154; CSci 146, 156, 172, 175.

Seventh Semester—ApSc 115; CSci 163, computer science elective; humanities or social science electives (6 hours); non-technical elective.

Eighth Semester—CSci 164, computer science elective; humanities or social science electives (6 hours); non-technical elective.

Electrical Engineering

Electrical engineering is concerned with the generation, transmission, control, and utilization of electricity. Electrical engineers design generators, electronic circuits, transmission networks, and voice, data, and video communications systems. They harness electromagnetic radiation and develop instrumentation.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 49; Math 32; Phys 41; humanities or social sciences electives (6 hours).

Third Semester—ApSc 57, 113; EE 11, 63; Math 33; Phys 42.

Fourth Semester—ApSc 58, 114, 130; EE 12, 20, 65.

Fifth Semester—ApSc 115; CSci 140; EE 31, 66, 67, 122; humanities or social sciences elective.

Sixth Semester—CSci 110; EE 32, 121, 169, 172, 177.

Seventh Semester—EE 143, 163; technical electives (6 hours); laboratory elective; humanities or social sciences elective.

Eighth Semester—EE 144, 164; technical electives (6 hours); laboratory elective; humanities or social sciences elective.

Technical Electives and Laboratory Electives—Students may, with the permission of their advisor, select courses from engineering, mathematics, or physical sciences with course numbers above 100.

Medical Preparation Option in Electrical Engineering

The medical preparation option permits the student to obtain a bachelor's degree in electrical engineering and have sufficient preparation to apply to medical school. The student is also prepared to work in various health sciences fields, to conduct research toward development of electronic equipment to assist the medical profession in diagnosing and treating disease, or to continue as a graduate student in engineering with exceptional qualifications for medical engineering. Students pursuing medical preparation and applying to medical school should consult the SEAS representative to the University's premedical committee.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 49; Math 32; Chem 12; Phys 41; humanities or social sciences elective.

Third Semester—ApSc 113; EE 11, 63; Math 33; BiSc 11; Phys 42.

Fourth Semester—ApSc 114; EE 12, 20, 65; BiSc 12; humanities or social sciences elective.

Fifth Semester—ApSc 57; Chem 151, 153; CSci 140; EE 31, 66, 67, 122.

Sixth Semester—ApSc 58, 115; Chem 152, 154; EE 32, 121, 169.

Seventh Semester—EE 143, 163, 172, 184, 186; humanities or social sciences electives (6 hours).

Eighth Semester—EE 164, 192, 196; CSci 110; technical elective chosen from CSci 120, 131; BiSc 102, 107, 118; laboratory elective selected from EE 146, 147, 166, 167, 168, 176; humanities or social science elective.

Mechanical Engineering

Mechanical engineering encompasses a vast diversity of industrial activities. Mechanical engineers conceive, plan, design, and direct the manufacture, distribution, and operation of complex systems. Applications include aerospace, energy conversion, computer-aided design and manufacturing, power and propulsion systems, robotics, and control systems.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 50, EngS 4; Math 32; Phys 41; humanities or social sciences elective.

Third Semester—ApSc 57, 113, 115; Math 33; Phys 42.

Fourth Semester—ApSc 58, 114, 130; EE 11; humanities or social sciences electives (6 hours).

Fifth Semester—CE 120, 166, 167; ME 117, 126, 131.

Sixth Semester—EE 20; ME 120, 134, 187, 191; humanities or social sciences elective.

Seventh Semester—ME 149, 182, 190, 192, 193; design elective selected from EngS 282 or ME 243 or 259.

Eighth Semester—ME 152, 195, 196; technical electives selected from chosen area (6 hours); humanities or social sciences elective.

Technical Electives

Computer-Aided Design—ApSc 199; CSci 120, 140, 144, 157; EngS 282, 283, 284, 285; ME 198, 241, 245, 251.

Energy and Power—ApSc 199; EngS 208; ME 155, 198, 257, 258, 259, 260, 291.

Fluid Mechanics and Thermal Sciences—ME 155 (required); ApSc 199; EngS 218; ME 198, 221, 231, 237, 280, 288, 289.

Mechanical Engineering Design—ApSc 199; EngS 215, 257, 284, 285; ME 198, 240, 241, 242, 243, 245, 251.

Solid Mechanics and Materials Science—EngS 218 (required); ApSc 199; EngS 215, 221, 233, 234, 237, 285; ME 198; Phys 170.

Medical Preparation Option in Mechanical Engineering

The medical preparation option leads to a bachelor's degree in mechanical engineering and prepares the student for application to medical school. The student is also prepared to work in research and development or to pursue graduate study in the fields of biomechanics and biotechnology. Students pursuing medical preparation and applying to medical school should consult the SEAS representative to the University's premedical committee.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—EngS 4; CSci 50; Math 32; Chem 12; Phys 41.

Third Semester—ApSc 57, 113; Math 33; BiSc 11; Phys 42; humanities or social sciences elective.

Fourth Semester—ApSc 58, 130; EE 11; BiSc 12; humanities or social sciences elective.

Fifth Semester—CE 120, 166, 167; ME 117, 126, 131; Chem 151, 153.

Sixth Semester—EE 20; ME 120, 134, 187, 191; Chem 152, 154.

Seventh Semester—ME 149, 182, 190, 192, 193; humanities or social sciences elective.

Eighth Semester—ApSc 115; ME 152, 195, 196; humanities or social sciences electives (6 hours).

Systems Analysis and Engineering

The multidisciplinary field of systems analysis and engineering applies scientific methods and engineering techniques to the solution of complex technical problems. Through the processes of observing, understanding, and predicting the behavior of human–machine interfacing systems, practitioners of systems analysis and engineering help in the decision-making process for optimal improvement of these systems.

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; humanities or social sciences elective.

Second Semester—CSci 51; Math 32; Phys 41; humanities or social sciences electives (6 hours).

Third Semester—ApSc 57, 113; CSci 131; Math 33; Phys 42.

Fourth Semester—ApSc 114, 115; CE 120; CSci 110; EMgt 160; humanities or social sciences elective.

Fifth Semester—ApSc 116; ME 117; OR 101, 109; Stat 187.

Sixth Semester—Engl 110; EMgt 269; ME 120; OR 102; technical elective; humanities or social sciences elective.

Seventh Semester—ME 192; OR 135, 154, 171; technical elective; humanities or social sciences elective.

Eighth Semester—OR 173, 182, 191; two technical electives.

Technical Electives

Each systems analysis and engineering major will gain specific expertise in a chosen technical area by taking a four-course sequence from another department or departments of the University. The four technical electives are selected with the approval of the student's academic advisor. Areas frequently chosen are computer science, economics, finance, management, mathematics, naval science, statistics, and specific fields of engineering.

Medical Preparation Option in Systems Analysis and Engineering

The medical preparation option leads to a bachelor's degree in systems analysis and engineering and quantitatively prepares students for medical careers through a program that emphasizes decision modeling. Decision modeling is becoming increasingly applicable to the medical field because of the growing use of computers and information systems in medicine and the interplay of diagnosis, treatment, and economics.

First Semester—Chem 11; Engl 9 or 10; EngS 1; Math 31; humanities or social sciences elective.

Second Semester—Chem 12; CSci 51; Math 32; Phys 41; humanities or social sciences elective.

Third Semester—ApSc 57, 113; BiSc 11; Math 33; Phys 42.

Fourth Semester—ApSc 114, 115; BiSc 12; CE 120; CSci 131; humanities or social sciences elective.

Fifth Semester—ApSc 116; Chem 151, 153; EMgt 160; ME 117; OR 101; Stat 187.

Sixth Semester—Chem 152, 154; Engl 110; ME 120; OR 102, 109.

Seventh Semester—EMgt 269; ME 192; OR 135, 154, 171; humanities or social sciences elective.

Eighth Semester—CSci 110; OR 173, 182, 191; humanities or social sciences electives (6 hours).

Five-Year Bachelor of Science (Systems Analysis and Engineering)/ Master of Science in the Field of Operations Research

Course work for the bachelor's degree comprises the same courses as the standard B.S. (S.A.&E.). Application to the graduate portion of the program is ordinarily made after the fifth semester; students must be accepted for the graduate portion before the start of the seventh semester. The bachelor's degree is awarded after the eighth semester.

The fifth year of study, leading to the master's degree, offers two options.

For the regular M.S. in operations research, students take OR 216 and seven other graduate courses chosen in consultation with the advisor. At least five of the seven courses must be in the Department of Operations Research.

For the M.S. in operations research with a concentration in management science, students take OR 236, EMgt 281 or 283, EMgt 287 or Mgt 224 or 226, and five other graduate courses selected with the approval of the advisor from course offerings in the Department of Operations Research and other departments of the University.

After completing the fifth year of course work, students receive the M.S. degree. See the Graduate Programs Bulletin.

Five-Year Bachelor of Science (Systems Analysis and Engineering)/ Master of Arts in the Field of Economics

First Semester—Engl 9 or 10; EngS 1; Math 31; Chem 11; Econ 11.

Second Semester—CSci 51; Math 32; Phys 41; Econ 12; humanities elective.

Third Semester—ApSc 57, 113; CSci 131; Math 33; Phys 42.
Fourth Semester—ApSc 114, 115; CE 120; CSci 110; Econ 101; EMgt 160.
Fifth Semester—ApSc 116; Econ 102; ME 117; OR 101, 109; Stat 187.
Sixth Semester—Econ 123; Engl 110; ME 120; OR 102; humanities elective.
Seventh Semester—Econ 203; EMgt 269; OR 135, 154; humanities elective.
Eighth Semester—Econ 204, 205; OR 173, 182, 191.

Course work for the bachelor's degree differs from the standard B.S.(S.A.&E.) in that the three social science electives and four technical electives are all in economics, and that Econ 123 substitutes for OR 171. Application to the graduate portion of the program is ordinarily made after the fifth semester, and students must be accepted for the graduate portion prior to the start of the seventh semester. The bachelor's degree is awarded after the eighth semester.

The ninth and tenth semesters consist of course work toward the master's degree. Required: the general requirements of Columbian School of Arts and Sciences, including Econ 206 and 275 and six graduate economics electives. The Master's Comprehensive Examination must be satisfactorily completed in microeconomic and macroeconomic theory. See the Graduate Programs Bulletin.

Five-Year Bachelor of Science (Systems Analysis and Engineering) / Master's Degree in the Field of Engineering Management

Course work for the bachelor's degree differs from the standard B.S. (S.A.&E.) only in that the four technical electives are EMgt 211, 212, 254, and 283. Application to the graduate portion of the program is ordinarily made after the fifth semester, and students must be accepted for the graduate portion prior to the start of the seventh semester. The bachelor's degree is awarded after the eighth semester.

The fifth year of study, leading to the Master of Engineering Management or Master of Science in the chosen area within the field of engineering management, consists of EMgt 260 plus eight courses (nonthesis option) selected from the engineering management graduate programs of study. The core courses will have been taken during the senior year. After completing the fifth year of course work, students receive the M.E.M. or M.S. degree. See the Graduate Programs Bulletin.

Five-Year Programs in Engineering and Physics

Five-year programs that lead to a Bachelor of Arts with a major in physics and a Bachelor of Science in any SEAS undergraduate field are available. Please check with the SEAS Office of the Dean or with the Physics Department of Columbian School of Arts and Sciences.

Integrated Engineering and Law Program

In addition to the combined bachelor's/master's programs that may be completed in five years, the University offers the integrated B.S./J.D. The program provides an opportunity for highly qualified high school students to follow an education path composed of a B.S. degree in a SEAS field and then a J.D. degree, by assuring admission to the Law School's J.D. program for students who meet stated conditions. Detailed information on this program is available from the Office of Admissions.

Integrated Engineering and Medicine Program

The University offers an integrated engineering and medicine program that provides an opportunity for very highly qualified high school students to earn a

B.S. degree in a SEAS field and then an M.D. degree, by assuring admission to the School of Medicine and Health Sciences' M.D. program for students who meet stated conditions. Detailed information is available from the Office of Admissions.

Honors Research Program

To provide individualized research experience to academically gifted students, the School has established an Honors Research Program. A student who maintains a grade-point average of 3.3 or above or is admitted to the School with a combined SAT score of 1250 and a rank in the upper 10 percent of his or her high school class is eligible for this program. Participants attend an honors research seminar and each works individually with a faculty member, performing a research project of mutual interest. Students participating in the program earn 3 credits per semester; a minimum of 9 credits is needed to complete the program. Upon written request by the student, 6 of these credits may be used as technical electives. Qualified students interested in applying for the program should contact the honors research chairman of the department in which the research is to be conducted.

Secondary Fields of Study

The School of Engineering and Applied Science offers secondary fields of study in computer science, electrical engineering, engineering analysis, and operations research to students in other schools of the University.

SEAS students are cautioned to consult their advisor and department chair before enrolling in a secondary field of study in another school of the University.

3:2 Dual-Degree Programs Combining Liberal Arts and Engineering

The School of Engineering and Applied Science has developed 3:2 dual-degree programs in liberal arts and engineering with the following accredited institutions: Bowie State University, Gallaudet University, Hood College, St. Thomas Aquinus College, and Trinity College of Washington, D.C.

Students initially enroll in the 3:2 dual-degree program at one of the above institutions and pursue a three-year course of studies covering social sciences, humanities, mathematics, physics, and chemistry, which helps the student develop broad cultural perspectives, analytic abilities, and communication skills. Students then follow a two-year program at the School of Engineering and Applied Science. During this phase of study, students may specialize in any of the areas of engineering or computer science offered in the School's regular four-year programs. Upon successful completion of the two-year program at George Washington University, students are awarded two baccalaureate degrees: a B.S. or B.A. from the first institution and a B.S. in engineering or computer science from GW.

For further information on the 3:2 dual-degree programs, contact the admissions offices of the institutions listed above.

ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS

Dean H. Harding
Associate Deans E.A. McCord, N.J. Brown

Introduction

The Elliott School of International Affairs offers graduate and undergraduate programs to prepare individuals for an increasingly international and multinational environment. The historical roots of the Elliott School can be traced back to the establishment of the School of Comparative Jurisprudence and Diplomacy in 1898. In 1966, the School separated from the School of Government, Business, and International Affairs to become an independent unit, the School of Public and International Affairs. In 1987, the name was changed to the School of International Affairs, and in 1988 the School was renamed in honor of Evelyn E. and Lloyd H. Elliott, the President of The George Washington University from 1965 to 1988.

The Degree of Bachelor of Arts

The Elliott School offers programs leading to the degree of Bachelor of Arts in the fields of international affairs, East Asian studies (China or Japan), Latin American studies, and Middle Eastern studies. Programs are multidisciplinary and emphasize both domestic and foreign governmental policy. Curricula draw heavily on the various academic departments of the University. Programs are designed to foster a liberal education that focuses on a solid understanding of major historical and contemporary issues in international affairs; the programs tend to have a broader base than a major in a traditional academic discipline.

Entrance Requirements

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics beyond introductory algebra.
2. The principal or counselor's statement that the applicant is prepared to undertake college work.
3. Standardized test scores submitted on SAT I or ACT and on SAT II subject tests in writing, mathematics, and one other subject test of the student's choice.

It is recommended that the College Board examinations be taken in December or January. Scores on tests taken in the junior year may be submitted.

American College Testing battery scores are also accepted. It is recommended that the applicant take the tests in October of the senior year.

Consideration can be given to the adequacy of the qualifications of an applicant who, because of unusual circumstances, does not present all the requirements stated here. Appropriate scholastic aptitude tests may be prescribed.

Admission with Advanced Standing

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University are as follows. Applicants who have accumulated at least 30 credit hours (or the equivalent) of academic credit at another regionally accredited college or

university may be admitted to the Elliott School of International Affairs as transfer students with advanced standing. Those who have achieved a grade-point average of at least 3.0 on a 4.0 scale in previous college work will be given preference for admission. Applicants who have completed fewer than 30 credit hours of acceptable credit must meet entrance requirements for freshmen.

Advanced standing may be awarded for properly certified courses for which the student received a grade of *C−* or above, provided that such courses are comparable to the curriculum requirements for the degree sought in the Elliott School. In the case of course work completed at a two-year college, no more than 66 credit hours of credit may be applied as advanced standing toward a degree in this School.

Although a grade of *D* in a course is not acceptable for transfer, the course may satisfy a curriculum requirement. Credits earned with a grade of *D* will not, however, be assigned as advanced standing.

The Elliott School reserves the right to refuse credit for transfer in whole or in part or to accept credit provisionally.

It is the responsibility of the student to have an official transcript from each institution formerly attended sent directly to the Office of Admissions, George Washington University, Washington, D.C. 20052.

Students wishing to transfer from another division of the University into a degree program in the Elliott School must submit to the Office of Admissions a formal application for transfer and must be in good academic standing with a cumulative grade-point average of 2.5 or above at the time of transfer. A maximum of 45 credit hours earned as a nondegree student in the Division of University Students may be applied toward a degree in this School.

All transfer students must satisfy the residence and course requirements for degrees awarded by the Elliott School.

Regulations

See Admissions; Fees and Financial Regulations; University Regulations.

General Requirements for the Degree

Academic Work Load

The normal academic work load for a full-time student is 15 credit hours. A full-time student not on probation may take a course load of up to 17 credit hours. A student with a strong academic record may take up to 18 credit hours with the approval of the dean. Students on probation are limited to 13 hours.

Attendance

Students are held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor before provision is made to make up the work missed. A student suspended for any cause may not attend classes during the period of suspension.

Scholarship Requirements

In order to graduate, a student must have the following: (1) 120 credit hours of passing grades (courses in exercise and sport activities cannot be included in the required hours); and (2) a cumulative grade-point average of at least 2.0.

Dean's Honor List

The name of every student who attains a 3.5 grade-point average in course work is placed on the Dean's Honor List for that semester. Appearance on the list is limited to full-time students registered for a minimum of 12 credit hours in a

given semester and to part-time students registered for a minimum of 12 credit hours over a period of two consecutive semesters, which may include a summer term.

Academic Standing

A student whose cumulative grade-point average is less than 2.0 but at least 1.0 any time after having attempted a minimum of 24 credit hours is placed on probation: "first probation" for the initial semester, "second probation" if continued on probation for a second semester. For part-time students and those enrolled in summer sessions, a semester is interpreted to mean a time interval in which at least 12 credit hours have been attempted. A student on probation is limited to no more than 13 credit hours of course work per semester.

A student who resumes a cumulative grade-point average of 2.0 or more after a first or second semester on probation is removed from probationary status. Failure to resume a cumulative grade-point average of 2.0 after two successive semesters on probation results in suspension. The Dean's Council may continue a student on probation if satisfactory progress is demonstrated during the probation period.

A student whose cumulative grade-point average falls below 1.0 any time after having enrolled in a minimum of 24 credit hours as a student in the Elliott School will be suspended.

Students who are suspended for poor scholarship may apply for readmission after the lapse of one fall or spring semester. To be considered for readmission, the student must submit evidence to the Dean's Council of conduct during absence from the University which indicates that the student will profit from readmission. A student suspended twice for poor scholarship will not be readmitted.

Semester Warning—A student whose cumulative grade-point average is less than 2.0 after attempting a minimum of 12 credit hours is placed on semester warning at the end of the semester and is strongly advised to take corrective measures (e.g., limitation of course load to no more than 13 credit hours).

Withdrawal

Withdrawal without academic penalty after the end of the ninth week of classes (fall or spring semester) is permitted only in exceptional cases (see Withdrawal under University Regulations).

Incomplete/Authorized Withdrawal

Conditions under which the grades *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described under University Regulations.

Changing an Incomplete—Incomplete course work must be completed no later than one calendar year from the last day of the examination period of the semester or summer session in which the grade of *I* was assigned. When work for the course is complete, the grade earned will be indicated in the form of *I*, followed by the final grade. The indication of *I* cannot be removed from the transcript. A grade of *I* that is not changed within this period automatically becomes part of the student's permanent record. The grade of *I* cannot be changed by reregistering for the course at GW or by taking its equivalent elsewhere. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the Dean's Council for additional time in which to complete the work of the course. Such petitions should be submitted within a year of the assignment of the grade of *I*.

Residence

Students must complete at least 60 of their final 90 hours in residence to earn a degree in the School. Within those 90 hours, students approved for study abroad

may be awarded up to 30 hours of credit. In all instances, students must complete their final 15 hours in residence.

Internships

Internships offer students the opportunity to make practical use of the knowledge they acquire in the classroom. Undergraduates who have completed at least 30 credit hours and have a cumulative grade-point average of at least 2.5 are eligible to arrange internships for credit (to a total maximum of 9 credits toward the degree) through the Elliott School internship coordinator. Academic work in the field of the internship is required. A zero-credit internship is also available.

Internships are available in the private and public sectors. Students are responsible for locating their own internships; listings are posted in the GW Career Center. (Additional listings are posted in the Elliott School.)

Double Majors

A student who completes the requirements of two major fields in the Elliott School (for example, international affairs and East Asian studies) may graduate with a double major. Such a student should consult with an Elliott School advisor and officially declare both majors on the appropriate form available in the Student Services office.

Regulations on Study Abroad

Students are encouraged to travel and study abroad. Those wishing to study abroad must consult their academic advisor and the study-abroad advisor. A maximum of 30 credits may be transferred in from study abroad (work completed at the GW Madrid Program does not count toward this maximum). Students must secure the dean's prior approval for any plan of study abroad if the credit earned is intended to apply to the degree program in which they are registered. A catalogue or other description of the foreign institution or study program must be presented for consideration together with detailed descriptions of the courses to be taken. See Study Abroad Programs.

Pass/No Pass Option

A student in the Elliott School of International Affairs who has a cumulative grade-point average of 2.5 or better may, with the approval of an advisor and the dean, take one course per semester and receive a grade of *P*, Pass, or *NP*, No Pass, which will be recorded on the student's transcript but will not be reflected in the cumulative grade average. A student must sign up for such an option at the Student Services office during the registration period. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the end of registration. Courses in the student's major (except those in which the grade of *P* or *NP* is normally assigned) may not be taken on a pass/no pass basis. A transfer student may not elect to take a course on a pass/no pass basis until the second semester of enrollment in the University. No more than six courses in which the grade of *P* or *NP* is assigned will apply toward the degree, including courses in which the grade of *P* or *NP* is normally given.

Common Curriculum Requirements in the Elliott School

Common curriculum requirements for Elliott School students are listed below. Requirements for the specific majors in international affairs, Latin American studies, Middle Eastern studies, and East Asian studies are outlined under the

appropriate heading in Courses of Instruction. For information on earning credit by examination or waiving curriculum requirements, students should see their academic advisor in the Elliott School.

All students take Engl 9 or 10 and 11; Econ 11–12; Hist 40 and 72; IAff 5; PSc 1; 6 to 9 credits of approved humanities courses; 20 to 22 credits of a modern foreign language (through the third-year level of proficiency); and 6 credits of an approved math or science sequence. Students should consult the program guidelines available from the Elliott School Office of Student Services before they choose courses to fulfill these requirements.

Secondary Fields of Study

Students can take a secondary field of study, such as business, economics, or languages, in other schools of the University. Students from other schools of the University can take a secondary field of study in international affairs in the Elliott School of International Affairs. See the brochure "Secondary Fields of Study," available in the Student Services Office.

SCHOOL OF MEDICINE AND HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH AND HEALTH SERVICES

The School of Medicine and Health Sciences offers programs to prepare health sciences professionals in selected disciplines, emphasizing the interdependent roles of the network of professionals who constitute the health care team.

In addition to the Bachelor of Science in Health Sciences degree programs listed below, certificate programs are offered in several areas—some in conjunction with degree programs, others freestanding, such as clinical laboratory science, paramedic, and radiation therapy.

For specific information on the content and requirements of the undergraduate degree programs that follow, contact the Office of Recruitment and Admissions for Health Sciences and Public Health, George Washington University Medical Center, Washington, D.C. 20037.

Clinical Laboratory Science—Clinical laboratory scientists perform and evaluate various laboratory procedures to determine the absence, presence, extent, and basis of disease. As medical investigators, program graduates perform complex examinations on state-of-the-art instruments and computers in the areas of hematology, chemistry, microbiology, immunology, and blood banking.

Emergency Medical Services—Emergency medical services personnel may plan and organize programs, supervise emergency department clinicians, assist in projects that require expertise in emergency medical procedures, and function in the network of information systems that is central to emergency care.

Radiologic Sciences—The two clinical tracks in the radiologic science major are professional programs designed to educate the student in the diagnostic and therapeutic fields of radiology: diagnostic medical sonography and radiation therapy.

The School of Public Health and Health Services offers a Bachelor of Science degree program in the field of exercise science through the Department of Prevention and Community Health. The exercise science program offers four concentrations: athletic training, exercise and sport, health education and wellness, and pre-health professional. The program prepares students for careers in athletic training, coaching, corporate fitness programs, sport management, exercise physiology, exercise rehabilitation, and health promotion, as well as graduate study in exercise science, sport psychology, physical therapy, and other clinical health professions.

Joint Programs Leading to the Doctor of Medicine

In addition to the integrated Bachelor of Arts/Doctor of Medicine program described under Columbian School of Arts and Sciences, the School of Medicine and Health Sciences offers an early selection program intended to give talented and committed students early assurance of admission to the M.D. program. Students of exceptional promise are chosen for the early selection program at the end of their sophomore year and are expected to modify their planned curriculum for the junior and senior years toward more creative and difficult course choices. Early assurance of admission is planned to provide students the freedom to pursue a rigorous liberal education, while completing minimal premedical requirements without concern for the grade-point average. Specific details about the early selection program are available through the Office of Admissions of the School of Medicine and Health Sciences.

COURSES OF INSTRUCTION

The following section provides listings and descriptions of courses offered by the departments of instruction and interdepartmental programs. Degree requirements of departments and programs in Columbian School of Arts and Sciences and the Elliott School of International Affairs appear under the department or program heading; degree requirements of the School of Engineering and Applied Science and the School of Business and Public Management appear under the respective school's section.

The number of credit hours given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the title of the course. Thus, a year course giving 3 credit hours each semester is marked (3–3), and a semester course giving 3 credit hours is marked (3). A credit hour may be defined as one 50-minute period of class work or one laboratory period a week for one semester.

Following most course descriptions is a parenthetical statement listing the semester (fall or spring) for which the course is scheduled. The term *academic year* is used only with two-semester courses and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. Not all offerings for the summer sessions are listed in this Bulletin. Students should consult the Summer Sessions Announcement for additional summer offerings. Schedules of Classes are published for the fall and spring semesters to provide information concerning the time of course offerings.

The courses as listed here are subject to change. The University reserves the right to withdraw any course announced or to change the course fees shown herein.

Explanation of Course Numbers

Courses numbered 1–100 are planned for students in the freshman and sophomore years. With the approval of the advisor and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

Courses numbered 101–200 are planned for students in the junior and senior years. Except for accountancy courses, they may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work to receive graduate credit. Accountancy courses numbered 101–200 may not be taken for graduate credit.

Courses numbered 201–300 are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Business and Public Management registering for these courses must have a 3.0 average, the prior approval of the department chairman who is responsible for the graduate course, and the prior approval of the dean. Nondegree students who have not completed a bachelor's degree may not enroll in graduate courses offered by the School of Business and Public Management. A few courses are numbered in the 400s to set them apart for various administrative reasons; these courses are generally analogous to courses numbered in the 200s.

Courses numbered 301–400 in Columbian School of Arts and Sciences and the School of Engineering and Applied Science are limited to graduate students, but they are primarily for doctoral candidates. Courses numbered 301–400 in the School of Business and Public Management are primarily for doctoral students; the courses are open to selected master's students upon approved petition. In the Graduate School of Education and Human Development courses numbered 301–400 are limited to graduate students with master's degrees from accredited institutions.

Courses numbered 701 and 721 represent an ongoing program of curriculum innovation at GW. The 701 number is used to designate experimental courses taught by individual faculty members. The 721 number designates innovative interdepartmental courses. The 751 number is used to list courses sponsored jointly by two or more schools. Courses numbered in the 770s and 780s are taught by scholars who hold appointments as University Professors. The 700 numbers do *not* indicate the level of difficulty. Courses in this series range from freshman-level offerings to classes designed for seniors and graduate students. Unless the course description in the *Schedule of Classes* indicates that there are prerequisites or that an interview with the instructor is required prior to registration, 700 courses are open to all interested students, subject to their advisor's approval and the rules of the respective schools.

Key to Abbreviations

The following abbreviations are used for course designations:

Accy	Accountancy
AdSc	Administrative Sciences
AmSt	American Studies
Anat	Anatomy
Anes	Anesthesiology
Anth	Anthropology
ApSc	Applied Science
Arab	Arabic
Art	Art
ArTh	Art Therapy
Astr	Astronomy
Bioc	Biochemistry
BiSc	Biological Sciences
BmSc	Biomedical Sciences
Bios	Biostatistics
BAdm	Business Administration
Chem	Chemistry
Chin	Chinese
CE	Civil Engineering
Clas	Classical Studies
CSAS	Columbian School of Arts and Sciences
Comm	Communication
CpIS	Computational Sciences
CpMd	Computer Medicine
CSci	Computer Science
Cnsl	Counseling
Derm	Dermatology
Econ	Economics
Educ	Educational Leadership
EE	Electrical Engineering
EMda	Electronic Media
EMed	Emergency Medicine
EMgt	Engineering Management
EngS	Engineering Science
Engl	English
EFL	English as a Foreign Language
E&RP	Environmental and Resource Policy
Envr	Environmental Studies
Epid	Epidemiology
EMBA	Executive Master of Business Administration
ExSA	Exercise and Sport Activities
ExSc	Exercise Science
Fina	Finance
ForS	Forensic Sciences
Fren	French
Gnet	Genetics
Geob	Geobiology
Geog	Geography
Geol	Geology
Ger	German Language and Literature
Grek	Greek
HCS	Health Care Sciences
HSci	Health Sciences
HSMP	Health Services Management and Policy
Hebr	Hebrew
Hist	History
Honr	Honors
HRD	Human Resource Development
HmSc	Human Sciences
HmSr	Human Services
Hmn	Humanities
Idis	Interdisciplinary Courses
IAff	International Affairs
IBus	International Business
Ital	Italian
Japn	Japanese
Jour	Journalism
Kor	Korean
Latn	Latin
Law	Law
Ling	Linguistics
Mgt	Management Science
Mktg	Marketing
MBAd	Master of Business Administration
Math	Mathematics
ME	Mechanical Engineering
Med	Medicine
Micr	Microbiology
Onco	Molecular and Cellular Oncology
MStd	Museum Studies
Mus	Music
NSc	Naval Science
NSur	Neurological Surgery

Neur	Neurology
NeuS	Neuroscience
Ob&G	Obstetrics and Gynecology
OR	Operations Research
Opht	Ophthalmology
Orth	Orthopaedic Surgery
Path	Pathology
PStd	Peace Studies
Peds	Pediatrics
Phar	Pharmacology
Phil	Philosophy
Phys	Physics
Phyl	Physiology
PCm	Political Communication
PMgt	Political Management
PPsy	Political Psychology
PSc	Political Science
PsyD	Professional Psychology
Pchi	Psychiatry and Behavioral Sciences
Psyc	Psychology
PAd	Public Administration
PubH	Public Health
PPol	Public Policy
Rad	Radiology
Rel	Religion
Rom	Romance Literatures
SMPA	School of Media and Public Affairs
SLP	Service–Learning Program
Slav	Slavic Languages and Literatures
Soc	Sociology
SocL	Sociology: Legal Assistant Program
Span	Spanish
SpEd	Special Education
SpHr	Speech and Hearing
Stat	Statistics
SMPP	Strategic Management and Public Policy
Surg	Surgery
TrEd	Teacher Education
TCom	Telecommunication
TrDa	Theatre and Dance
TStd	Tourism and Hospitality Management
Univ	University
Urol	Urology
Viet	Vietnamese
WStu	Women's Studies
Ydsh	Yiddish

ACCOUNTANCY

Professors C.M. Paik, M.G. Gallagher, J. Hilmy, D.R. Sheldon (*Chair*), W.R. Baber, C.E. Tierney
Associate Professors L.G. Singleton, K.E. Smith, L.C. Moersen, F.W. Lindahl, K.R. Kumar
Assistant Professor G. Visvanathan

See the School of Business and Public Management for programs of study in accountancy leading to the degree of Bachelor of Accountancy.

51 Introductory Financial Accounting (3) Kumar
Basic knowledge of financial accounting concepts and standards as an essential part of the decision-making process for the management of private investment and for business and government organizations. Same as BAdm 51. Prerequisite: sophomore standing. (Fall and spring)

101 Cost and Budgetary Control (3) Lindahl
Nature, objectives, basic systems, and procedures of cost accounting and control: cost–volume–profit relationships, standard costs and variance analysis, variable costing, relevant costs, process costing, costing for services, activity-based costing, budgeting, cost allocations. Prerequisite: Accy 51. (Fall)

121 Intermediate Accounting I (3) Singleton
Accounting principles underlying the preparation of financial statements and their application in the measurement and reporting of selected balance sheet items and related revenue and expense recognition; accounting for receivables, inventories, fixed assets, intangible assets, and liabilities. Prerequisite: Accy 51. (Spring)

122 Intermediate Accounting II (3) Singleton
Accounting for stockholders' equity, earnings per share, debt and equity investments, income taxes, pensions and other postretirement benefits, leases, accounting changes, statement of cash flows, financial statement analysis and disclosure. Prerequisite: Accy 121. (Fall)

132 Accounting Theory (3) Hilmy
Current thought as reflected in the pronouncements of leading professional and accounting research associations, major contributions to accounting literature. Prerequisite: Accy 122. (Spring)

151 **Business Law: Contracts, Torts, and Property** (3) Moersen
Essential legal principles of contracts, torts, and property, including trusts and estates, leases, professional liability, and the Uniform Commercial Code. Same as SMPP 105. Prerequisite: Accy/BAdm 51. (Fall)

152 **Business Law: Enterprise Organization** (3) Moersen
The legal aspects of organizing, financing, and operating an enterprise: agency, partnerships, corporations, securities regulation, insurance, secured credit financing, and commercial paper. Same as SMPP 106. Prerequisite: Accy/BAdm 51. (Spring)

153 **Business Law: Regulatory Environment of Business** (3) Moersen
General overview of the legal system, role of law, and business regulation. Specific business applications include administrative law, antitrust, employer and consumer obligations, securities regulation, international law. Same as SMPP 104. (Fall and spring)

161 **Federal Income Taxation: Individuals** (3) Smith
A study of federal income tax concepts with primary emphasis on individuals. Prerequisite: Accy 51. (Fall)

162 **Federal Income Taxation: Corporations, Partnerships, Estates, and Trusts** (3) Staff
Federal income tax concepts applicable to corporations, partnerships, estates, and trusts; tax research and planning. Prerequisite: Accy 161. (Spring)

171 **Auditing** (3) Tierney
A study of generally accepted auditing standards, accepted professional auditing practices and procedures, and governmental auditing standards, including reviewing and evaluating financial controls, auditing financial statements, and testing financial data of manual and computer based accounting systems. Prerequisite: Accy 122. (Fall)

181 **Accounting Systems** (3) Staff
Introduction to the design and operation of accounting systems and data-management controls. Principles and applications of internal control applicable to manual and automated accounting systems. Prerequisite: Accy 101, 122. (Fall)

190 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods. Prerequisite: department approval.

191 **Advanced Accounting** (3) Staff
Application of accounting theory to special areas: consolidated statements, business combinations, earnings per share, foreign exchange, governmental and not-for-profit accounting. Prerequisite: Accy 122. (Spring)

199 **Independent Study** (3) Staff
Assigned topics. Admission by permission of the department chair. (Fall and spring)

AFRICANA STUDIES

Committee on Africana Studies
A. Alexander, F. Belgrave, A. Brooks, Y. Captain, M. Dow, R. Grinker, J. Hampton, J. Horton, D. Moshenberg, P. Palmer, J. Vlach, G. Wald

Minor in Africana studies—Offered through Columbian School of Arts and Sciences, the interdisciplinary minor consists of 21 credit hours, including a four-course core of Anth 178, AmSt Hist 173, Hmn 7, and either Hist 116 or Anth 181, plus three additional courses selected either from African or African American courses, as listed below. Special topics or 700 courses that pertain may be selected with approval of the advisor.

AmSt/Hist 173 *African American History*
Anth 170 *Cultures of the Caribbean*
Anth 178 *Cultures of Africa*
Anth 181 *African Roots from* Australopithecus *to Zimbabwe*
Engl 73–74 *Literature of Black America*
Engl 169 *Ethnicity and Place in American Literature*
Engl 174 *African American Literature*
Geog 164 *Geography of Africa*
Hist 116 *History of Africa*
Hist 174 *Special Topics in African American History*

Hist 184	*Civil War and Reconstruction*
Hmn 7	*African Humanities*
IAff 93	*Africa: Problems and Prospects*
Phil 125	*Philosophy of Race and Gender*
PSc 180	*Governments and Politics of North Africa*
PSc 182	*African International Politics*
PSc 186	*U.S. Policies Toward Sub-Saharan Africa*
Soc 179	*Race and Minority Relations*

AMERICAN STUDIES

Professors B.M. Mergen, H.F. Gillette, Jr., J.M. Vlach, J.O. Horton, R.W. Longstreth
Associate Professors P.M. Palmer (*Chair*), T.A. Murphy
Adjunct Associate Professor P.J. Cressey
Associate Professorial Lecturers B.G. Carson, R.D. Wagner, D.P. Tiller, E. Mayo
Assistant Professor M. McAlister
Assistant Professorial Lecturer O. Ridout

Bachelor of Arts with a major in American studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—AmSt 71–72.
3. Requirements for the major—AmSt 168, 171–72, 179–80, and four courses chosen from one of the following groups.

(a) Representations of American cultures—AmSt 145, 160, 165, 192; Anth 159, 162; Art 130, 148, 149, 197; Engl 160, 161, 162, 173, 177, 178; Jour 101; EMda 182; Rel 172.

(b) Multiculturalism: Gender, race, ethnicity—AmSt 115, 165, 173, 174, 185, 198; Anth 158, 171, 190; Art 148, 149; Engl 169, 174, 175, 187, 188; Rel 174; WStu 120, 125.

(c) The built environment—AmSt 144, 145, 175–76, 186, 194, 196, 225; Art 170; Engl 169; Geog 145, 151, 153, 187; PSc 111, 112.

In all cases of AmSt courses that are cross-listed with other University departments, students may register for the course in either department. With approval, other pertinent upper-level courses may be used to fulfill group requirements.

For Special Honors in American studies, a major must meet the special honors requirements stated under University Regulations, apply for honors candidacy before the end of the junior year, and complete a thesis (AmSt 199–200) with a grade of *A*.

Minor in American studies—Required: 18 credit hours of 100-level courses, including AmSt 167, 171–72, and three courses chosen with approval of the advisor from one of the three groups listed above.

50 Washington, D.C.: History, Culture, and Politics (3) Gillette
Introduction to interdisciplinary methods of studying the contemporary city. Major problems of metropolitan life, past and present, analyzed by faculty and community leaders. Emphasis on experiential team projects. Same as Hist/PSc 50. (Fall)

71–72 Introduction to American Studies (3–3) Mergen, Murphy, Palmer, McAlister
Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance. (Academic year)

139–40 Women in the United States (3–3) Harrison, Murphy
Same as Hist/WStu 139–40.

144 Explorations in Historical Geography (3) Staff
Examination of selected themes in the cultural geography of the United States over the course of its history, in relation to an overview of the historical geography of the country. Same as Geog 144. (Spring)

145 Folk Arts in America (3) Vlach
Same as Art 145.

160 Material Culture in America (3) Vlach
Review and analysis of the cultural messages embedded in our material surroundings. Consideration of a range of humanly created artifacts, ranging from specific objects to vast landscapes. Same as Anth 160.

165 Introduction to Folklore (3) Vlach
Survey of the forms of folk expression, including verbal art, music, dance, and material culture. Examination of the materials and methods of folklore research. Same as Anth 165.

167 **Themes in U.S. Cultural History** (3) Gillette, Mergen
An examination of the special ideas, values, and modes of expression that have made American life distinctive, as revealed through a variety of sources, including fiction, popular media, photography and the arts, and material culture. Same as Hist 167. (Fall)

168 **Cultural Criticism in America** (3) McAlister
A variety of approaches to cultural criticism, encompassing the nature of aesthetic accomplishment as well as the social contexts that alter and enrich the shape of cultural expression. The significance of culture to politics, social life, and the development of individual and collective identities. (Fall)

171–72 **U.S. Social History** (3–3) Horton, Stott, Gillette
Same as Hist 171–72.

173 **African American History** (3) Alexander
Same as Hist 173.

174 **Special Topics in African American History** (3) Horton
Same as Hist 174.

175–76 **American Architecture** (3–3) Longstreth
Stylistic properties, form and type characteristics, technological developments, and urbanistic patterns are introduced as a means of interpretation of historic meaning. Buildings are analyzed both as artifacts and as signifiers of social, cultural, and economic tendencies. AmSt 175: 1600–1860; AmSt 176: 1860–present. Same as Art 176 and 191. (Academic year)

179 **Practicum in American Studies** (3)
For American studies majors in their senior year. Supervised assignments in public or private agencies engaged in the investigation, interpretation, or conservation of the social, material, and expressive elements that constitute American culture. Biweekly seminar on campus. (Fall)

180 **Proseminar in American Studies** (3)
For American studies majors in their senior year. Readings and directed work in preparation for public symposium at the end of the academic year. (Spring)

186 **U.S. Urban History** (3) Stott, Gillette
History of the American city from colonial foundations to the present, focusing on relationships between social and economic forces with physical form. Special emphasis on transitions from pre-industrial to industrial to metropolitan forms, with attention to implications for public policy and historic preservation. Same as Hist 186. (Fall)

187 **Building Cities** (3) McGrath
Same as Geog 187.

192 **The American Cinema** (3) Mergen
History and criticism of American films. The course will enable the student to recognize and evaluate cinema techniques, to express the evaluation clearly in writing, and to understand the role of films in the context of American culture. Same as Art 192. (Spring)

193 **Archaeology Field/Laboratory Research** (3) Brooks, Cressey
Same as Anth 193.

194 **Historical Archaeology** (3) Cressey
Same as Anth 194.

195 **Independent Study** (1 to 3) Staff
Open to a limited number of American studies majors as directed research or as an internship with a Washington museum or historical society. Approval of advisor required. (Fall and spring)

197 **Oral History and Interview Techniques** (3) Mergen, Gillette
Introduction to theory and practice of obtaining and using historical data through recorded interviews. Examination of major published works in oral history. Particular attention to ongoing oral history projects in the Washington area. Same as Anth/Hist 197. (Summer)

198 **Special Topics** (3) Staff
May be repeated for credit provided the topic differs. Admission by permission of instructor.

199–200 **Senior Honors Thesis** (3–3) Staff
Directed research project. Open only to honors candidates in American studies. (Academic year)

ANTHROPOLOGY

Professors R.M. Krulfeld, R.L. Humphrey, A.S. Brooks, C.J. Allen (*Chair*), J.M. Vlach, D. Gow, B. Wood, X.-Q. Shao (*Research*), R. Rohrlich (*Research*)
Adjunct Professor G. Brana-Shute
Professorial Lecturers D.H. Ubelaker, S. Hertz, R. Potts, G. Teleki
Associate Professors J.C. Kuipers, B.D. Miller, R.R. Grinker, J.R. Wedel (*Research*)
Adjunct Associate Professors C.R. Rose, P.J. Cressey, N.L. Benco
Associate Professorial Lecturers D.W. von Endt, J. Love
Assistant Professorial Lecturers J.P. Homiak, J. Brady, P. Stanbury, D. Groenfeldt

Bachelor of Arts with a major in anthropology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Anth 1, 2, 3, and 4.
3. Required courses in other areas—(a) two-year proficiency in French, German, Russian, or Spanish (or another language approved by the Anthropology Department); (b) 6–12 credit hours of course work in related departments approved by the advisor. Recommended for ethnological emphasis are courses in economics, political science, psychology, and sociology; for archaeological emphasis, courses in American studies, art history, geography and regional science, geology, and history; for emphasis in biological anthropology, courses in anatomy and biological sciences; for emphasis in linguistic anthropology, courses in linguistics and in speech and hearing. Courses in statistics are strongly recommended for all anthropology majors.
4. Requirements for the major—In addition to the four prerequisite courses, 24–36 credit hours in anthropology courses, including Anth 198 and at least one course from each of the following five categories: aspects of culture (courses numbered in the 150s as well as 20, 191, 192, and 200); linguistics (161, 162, and 168); ethnology (courses numbered in the 170s); biological anthropology (courses numbered in the 140s); and archaeology (courses numbered in the 180s and 193, 194). Qualified seniors may enroll in 200-level seminar courses with the permission of the instructor. See the Graduate Programs Bulletin. Up to 6 credit hours of ethnographic or archaeological field school credit may be accepted and applied toward the major, if approved by the department, and majors are encouraged to participate in such programs. Opportunities are available for field and laboratory research during the academic year, both within the department and elsewhere in the Washington area. Credit for such work (not to exceed one-quarter of the student's total second-group credit hours in anthropology) may be granted through registration in Anth 195. Candidates for graduation with Special Honors must register for 3 credit hours of Anth 195, Undergraduate Research, and write a paper of special distinction arising out of a program of directed reading or research.

Bachelor of Arts with a major in archaeology—An interdepartmental major offered by the Anthropology Department in cooperation with the Art, History, and Classics Departments. The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Required courses in other areas: second-year proficiency in French, German, Latin, Greek, or a Near Eastern language. Further language study is strongly encouraged. Since graduate study in archaeology usually involves broader preparation and requires knowledge of at least one classical and one modern language, students intending to pursue graduate study should consult with the departmental advisor as early as possible in their undergraduate programs.
3. Required courses in the major: Anthropological archaeology—Anth 3 and 12 additional hours chosen from anthropology courses numbered in the 180s, 193, 194, or 195; at least 3 hours must be in New World archaeology (182, 185, 186) and at least 3 hours must be in Old World archaeology (181, 183, 184); students are urged to take 3 hours of archaeological fieldwork, such as Anth 114 or 115. Classical archaeology—6 hours chosen from Art 111, 112, 155. Classical Civilizations—15 hours chosen from Art 101, 102, 103; Clas 71, 72, 107, 108, 113, 170; and Hist 107, 108, 109, 110; at least 3 hours must be taken in each discipline (classics, art, history). Electives—3 to 12 hours of additional courses from the above lists, or other related courses in anthropology, art, classics, and history.

Minor in general anthropology—21 credit hours are required, including Anth 1, 2, 3, 4, 198, and two additional courses in anthropology, which must be taken in different subdisciplines. For the purposes of this minor, the department's courses may be divided into

subdisciplines as follows: biological anthropology—Anth 145, 146, 147, 148; archaeology—Anth 181, 182, 183, 184, 185, 186, 190, 193, and 194; anthropological linguistics—Anth 161, 162, and 168; sociocultural anthropology—all other 100-level courses, with the exception of Anth 195 and 196, in which the topic is variable (Anth 20 pertains as well).

Minor in archaeology—18 credit hours are required, including Anth 3, four courses chosen from Anth 181, 182, 183, 184, 185, 186, 190, 193, and 194; an approved field or research course or a fifth course chosen from the preceding list.

Minor in biological anthropology—16–19 credit hours are required, including Anth 1, 145, 146, 147, and 148; an approved field or research course or an approved course or course sequence in a related field (including biological sciences, geology, psychology, statistics, and certain other disciplines).

Minor in sociocultural anthropology—18 credit hours are required, including Anth 2 and 198; one course in ethnography (Anth 170–179); three courses in aspects of culture or methods (Anth 20, 150–159, 191, 192, or 200).

Minor in cross-cultural communication—18 credit hours are required, including Anth 2 or 4, 161, 162; Anth 150 or 159; one course in ethnography (Anth 170–179); one course chosen from Anth 153, 155, 158, 163, 165, or 168.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

1 **Biological Anthropology** (4) Brooks and Staff
Survey of human evolution, genetics and physical variation, and primatology. Frequent laboratory exercises. Laboratory fee, $20. (Fall and spring)

2 **Sociocultural Anthropology** (3) Allen, Krulfeld, Grinker, Miller
Survey of the world's cultures, illustrating the principles of cultural behavior. (Fall and spring)

3 **Archaeology** (3) Humphrey, Benco
Introduction to archaeological survey and excavation techniques and laboratory methods of dating and analysis. Brief history of archaeology and survey of world prehistory. Films and laboratory exercises. (Fall and spring)

4 **Language in Culture and Society** (3) Kuipers
Comparison and analysis of how cultures use language to communicate. The relationship of language to issues of human nature, gender, race, intelligence, artistic expression, and power. Laboratory fee, $15. (Spring)

20 **The Anthropology of Gender in Western Civilization** (3) Miller and Staff
Same as WStu 2.

114 **Paleoanthropological Field Program** (3 or 6) Brooks, Shao
Intensive course on field research in paleoanthropology, including excavation methods, identification and analysis of materials, paleoecology, archaeology, and human anatomy. Conducted at selected sites in Eurasia, Africa, or Australia. Visits to comparative sites and collections in the region. (Summer)

115 **Mesoamerican Field Program** (3 or 6) Humphrey, Brady
Same as Geog 115. (Summer)

145 **Human Osteology Laboratory** (2) Ubelaker
Identification of human skeletal remains by body part, age, sex, race, and individual disease or trauma history; study of skeletal variation in modern and recent populations. Taught at the Smithsonian. Corequisite: Anth 146. (Spring)

146 **Human Variation** (1) Ubelaker
An overview of human variation, with special emphasis on the skeleton. Includes history of physical anthropology, individual and population variations, archaeological recovery of human remains, paleodemography, growth, paleopathology, and forensic anthropology. Same as Anat 252. Prerequisite: Anth 1; corequisite for undergraduates: Anth 145. (Spring)

147 **Hominid Evolution** (3) Brooks, Wood
The fossil record of hominid evolution considered in the light of evolutionary theory. Brief review of the earlier human antecedents, with concentration on the Pleistocene remains. Laboratory fee, $20. Prerequisite: Anth 1. (Spring, alternate years)

148 **Primatology** (3) Teleki
Physical and behavioral characteristics of the various primate groups and their relationship to human physical and cultural evolution. Prerequisite: Anth 1. (Fall)

150 Comparative Value Systems (3) Krulfeld and Staff
World views, conceptual systems, and value orientations of representative cultures throughout the world.

151 Comparative Economic Systems (3) Krulfeld, Gow
The cross-cultural analysis of economic organizations, including hunters and gatherers, herders, cultivators, and peasants, the relationship of economy to ecology and to other aspects of culture; and the impact of the global economy.

152 Cultural Ecology (3) Staff
Basic principles of cultural ecology. Human interaction with the ecosystem both past and present; emphasis on the application of anthropological precepts to current environmental problems.

153 Psychological Anthropology (3) Staff
The cross-cultural study of the relationship between culture and personality. Topics include emotion, conceptions of the self, mental health and illness, sexuality, marriage and parenting, and cognition. Psychobiological, cultural, ecological, and psychoanalytical theories are examined. Prerequisite: Anth 2 or permission of instructor. (Spring, alternate years)

154 The Anthropology of Law (3) Staff
Cross-cultural examination of law and judicial systems. Comparison of processes of adjudication and mediation, including the logic of legal arguments, court procedures, and dispute resolution. Prerequisite: Anth 2 or permission of instructor.

155 Religion, Myth, and Magic (3) Allen
Theories of religion developed by anthropologists; survey of world religions with emphasis on non-Western societies; religious processes and change. Same as Rel 155.

156 Political Anthropology (3) Staff
Comparative analysis of political systems; political processes, such as factionalism, styles of leadership, political ritual. Prerequisite: Anth 2 or permission of instructor. (Fall, alternate years)

157 Moral Communities: From Family to Nation (3) Grinker
Cross-cultural analysis of how people form, maintain, and transform social groups and boundaries. Focus on how communities such as family, ethnic group, and nation are defined in moral terms. (Fall, alternate years)

158 Art and Culture (3) Krulfeld, Allen
The role of art in culture, with emphasis on small-scale societies; influences upon the artist, and beliefs and practices associated with art production. Prerequisite: Anth 2 or permission of instructor.

159 Symbolic Anthropology (3) Allen
The study of culture through the analysis of symbolic systems including myth, cosmology, folklore, art, ritual, political symbolism, and the symbolic study of kinship. Prerequisite: Anth 2 or permission of instructor. (Fall, alternate years)

160 Material Culture in America (3) Vlach
Same as AmSt 160.

161 Language, Culture, and Experience (3) Kuipers
Varieties of linguistic structure; the interrelationship of cognition and verbal behavior; the origin and evolution of human language; verbal organization of perception and emotion. Prerequisite: Anth 4 or permission of instructor. Laboratory fee, $20. (Fall)

162 Ethnographic Analysis of Speech (3) Kuipers
Linguistic variation and change in discourse practices; social and political correlates of linguistic interaction; verbal art. Prerequisite: Anth 4 or permission of instructor. Laboratory fee, $20. (Spring)

163 Ethnographic Film (3) Homiak
Still and motion-picture photography as an integral aspect of anthropological research. A study of recent and historic ethnographic films and an introduction to the forms and methods of making visual ethnographic records. Prerequisite: Anth 2 or permission of instructor. Material fee, $20.

165 Introduction to Folklore (3) Vlach
Same as AmSt 165.

168 Language and Linguistic Analysis (3) Tyndall and Staff
Same as Ling 101. (Fall)

170 **Cultures of the Caribbean** (3) Brana-Shute
Culture history and ways of life among the area's various cultural groups up to the ethnographic present. Prerequisite: Anth 2 or permission of instructor.

171 **North American Native Peoples** (3) Staff
Comparative study of Indian groups representative of the continent's culture areas. Prerequisite: Anth 2 or permission of instructor. (Fall)

172 **Cultures of Central and South America** (3) Allen
Culture history and ways of life in a selected region of Central or South America. Regional focus to be announced in the *Schedule of Classes*. Prerequisite: Anth 2 or permission of instructor. (Fall)

173 **Cultures of the Pacific** (3) Love
Culture history and ways of life among native peoples of Melanesia, Micronesia, and Polynesia. Prerequisite: Anth 2 or permission of instructor.

174 **Cultures of Southeast Asia** (3) Kuipers
Introduction to history, art, ecology, and politics of Southeast Asia. Comparison and interpretation of recent ethnographic case studies, archaeological evidence, and current political events in order to understand the diverse aspects of Southeast Asian traditions.

175 **East Asian Ethnography** (3) Grinker
Intensive study of the culture and history of selected East Asian peoples. Specific area to be announced in the *Schedule of Classes*. May be repeated for credit. Prerequisite: Anth 2 or permission of instructor.

176 **Cultures of the Far North** (3) Staff
Comparative study of the ecology, prehistory, and ethnography of the circumpolar cultures of arctic and subarctic North America and Eurasia.

177 **Cultures of the Near East** (3) Staff
Geographic environment, language, religion, and social structure of settled and nomadic peoples of the Near East: emphasis on the Arab world. Prerequisite: Anth 2 or permission of instructor.

178 **Cultures of Africa** (3) Grinker
Comparative examination of the history, cultural development, and contemporary problems of sub-Saharan African cultures. Prerequisite: Anth 2 or permission of instructor.

179 **Japanese Culture Through Film** (3) Hamano
Same as Japn 162.

181 **African Roots from *Australopithecus* to Zimbabwe** (3) Brooks
The development and contributions of Africa from human beginnings through medieval states. Topics include human evolution, origins of art, technology, trade, and animal/plant domestication, rise of African states, early relations with Europe and Asia, antecedents of contemporary African diversity. Prerequisite: Engl 11 or 13. (Spring)

182 **Archaeology of North America** (3) Staff
History of American archaeology; survey of North American culture history from human entry into the Americas during the Pleistocene period until the time of the first European contacts. Prerequisite: Anth 3 or permission of instructor.

183–84 **Old World Prehistory** (3–3) Brooks, Benco
Survey of prehistory in Europe, Africa, and Asia from the earliest hominid cultures to the beginnings of advanced civilizations. Anth 183: Paleolithic and Mesolithic cultures. Anth 184: Neolithic and Bronze Age cultures. Prerequisite: Anth 3.

185 **Archaeology of Mesoamerica** (3) Humphrey
Culture history of pre-Columbian Mexico and Central America from the Paleo-Indian period through the Spanish Conquest. Prerequisite: Anth 3 or permission of instructor.

186 **Archaeology of South America** (3) Staff
Culture history of pre-Columbian South America, with a focus on the Andes from the Paleo-Indian period through the Spanish Conquest. Prerequisite: Anth 3 or permission of instructor.

190 **Ethnohistory** (3) Staff
Reconstruction of the history of a selected preliterate society through the analysis of historical documents, oral traditions, archaeological remains, and other indirect sources. Specific topic to be announced in the *Schedule of Classes*. Same as Hist 190.

191 **Anthropology in Performance** (3) Garner, Allen
Exploration of the relationships among social interaction, ritual, and dramatic performance. Improvisation workshops and discussion based on readings about non-Western cultures. Same as TrDa 140. (Spring)

192 **Development Anthropology** (3) Stanbury and Staff
The impact of the world economy on nonindustrial societies. Analysis of the role of anthropology in international development programs aimed at alleviating problems in the Third World. Prerequisite: Anth 2 or permission of the instructor. (Fall)

193 **Archaeology Field/Laboratory Research** (3) Brooks, Cressey
Field and/or laboratory techniques and interpretation. Topics may include excavation methods, recording photography, preservation, stratigraphy and environmental reconstruction, typology, ceramic analysis, use–wear analysis, and spatial analysis. Specific research area and topics announced in the *Summer Sessions Announcement*. Same as AmSt 193. (Summer)

194 **Historical Archaeology** (3) Cressey
Survey of the basic data and methods of research in the material culture of recent history. Same as AmSt 194. (Spring)

195 **Undergraduate Research** (arr.) Staff
Individual research problems to be arranged with a member of the faculty. May be repeated for credit. Prerequisite: Appropriate introductory course or permission of instructor.

196 **Special Topics** (3) Staff
Courses offered by visiting faculty; experimental offerings. Topic to be announced in the *Schedule of Classes*. May be repeated for credit.

197 **Oral History and Interview Techniques** (3) Staff
Same as AmSt/Hist 197.

198 **Foundations of Anthropology** (3) Allen, Krulfeld, Grinker
The development of anthropological thought as seen in historical context. Exploration of selected basic concepts and theories of contemporary anthropology. To be taken in the junior or senior year. Prerequisite: Anth 2.

200 **Methods in Sociocultural Anthropology** (3) Krulfeld
Approaches to field research. Conceptual bases and biases in the delineation of problems and in the selection, analysis, and organization of data. Students will design and carry out their own field projects in the Washington area. Prerequisite: Anth 2 or permission of instructor. (Spring)

APPLIED SCIENCE

Interdepartmental course offerings in the School of Engineering and Applied Science

57 **Analytical Mechanics I** (2) Jones, Shames
First half of a one-year sequence. Concepts of statics: force systems, conditions of force and moment equilibrium, simple structures, distributed forces, centroids, internal forces, friction, moments of inertia. Prerequisite or concurrent registration: ApSc 113, Phys 41. (Fall and spring)

58 **Analytical Mechanics II** (3) Haque, Shames
Second half of a one-year sequence. Concepts of dynamics: kinematics of particles, velocity and acceleration, translating and rotating reference frames, particle dynamics, motion under central and electromagnetic force, effect of Earth's rotation, vibrations, work, kinetic and potential energy, dynamics of systems of particles. Prerequisite: ApSc 57. (Fall and spring)

113 **Engineering Analysis I** (3) Haque and Staff
Analytical methods for the solution of problems in engineering, the physical sciences, and applied mathematics: applications of ordinary differential equations, matrices and determinants, eigenvalues and eigenvectors, systems of ordinary linear differential equations, Bessel and Legendre functions. Credit cannot be earned for both ApSc 113 and Math 111. Prerequisite or concurrent registration: Math 33. (Fall and spring)

114 **Engineering Analysis II** (3) Kahn and Staff
Analytical methods for the solution of problems in engineering, the physical sciences, and applied mathematics: complex variables, Fourier series and integral, frequency filters, Laplace transforms, inversion and Duhamel integrals;

partial differential equations. Credit cannot be earned for both ApSc 114 and Math 112. Prerequisite: ApSc 113. (Fall and spring)

115 **Engineering Analysis III** (3) Soland and Staff
Analytical methods for the solution of engineering problems using concepts from probability and statistics: probability modeling, random variables and their distributions, mathematical expectation, sampling, point and confidence interval estimation, hypothesis testing, correlation, regression, and engineering applications. Prerequisite: Math 32; Engl 9 or equivalent. (Fall, spring, and summer)

116 **Engineering Analysis IV** (3) Soland and Staff
Analytical methods using advanced concepts from probability and statistics: multivariate distributions, expectation, generating functions, parametric families of distributions, sampling and sufficient statistics, estimation, hypothesis testing, and engineering applications. Prerequisite: ApSc 115, Math 33. May be taken for graduate credit. (Fall)

130 **Materials Science** (3) Gilmore and Staff
Structure of perfect and imperfect solids, thermodynamics of solids, reaction rate theory, electrons in solids, electron transport, electrical properties of junctions, magnetic materials, optical properties of materials. Prerequisite: Chem 11, Math 33, Phys 42. (Fall and spring)

199 **Honors Research Project and Seminar** (3) Staff
Student designs and carries out a research project under the supervision of a faculty advisor. Students from all engineering disciplines meet periodically to present projects and discuss results. Enrollment limited to students admitted to the Honors Research Program. May be repeated for credit.

ARABIC

See **Classics**.

ART

Professors L.F. Robinson (*Chair*), J.F. Wright, Jr., J.L. Lake, T. Ozdogan, M.P. Lader, C.C. Costigan, J.C. Anderson, W.T. Woodward, B. von Barghahn
Associate Professors H.I. Gates, D.M. Hitchcock, S.B. Molina, J.L. Stephanic, K.J. Hartswick, D. Bjelajac
Adjunct Associate Professor C.R. Rose
Associate Professorial Lecturers A.B. Barnhart, B.G. Carson, L.D. Miller, J.F. Harrop, J. Paradiso, W. Gaffney, S. Odland
Assistant Professor P. Jacks
Assistant Professorial Lecturers M.J. Francis, B.R. Stevens, R. Rodriguez, J.R. Spencer, M. Hasbun, R. Ghezzi, P. Pagratis, P. Wright

Bachelor of Arts with a major in art history—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Required courses in related areas—Art 137; Fren 4 or Ger 4.
3. Required courses in the major—Art 31–32, 71 or 72, 101 and 102, 104 or 105, 106 or 107, 108, 109 or 110, 113 or 114, 117 or 118, 129, and 9 additional credit hours in 100-level art history courses, for a total of 45 hours.

Bachelor of Arts with a major in fine arts—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. A total of 51 hours of art courses is required of fine arts majors except for students with a concentration in photography and visual communication, for whom 54 hours are required.
3. Required basic fine arts courses: Art 21–22 and 41–42.
4. Required courses in art history: Art 31–32; 6 additional credit hours in 100-level art history courses.
5. Required fine arts courses in the major:
   a. 12 hours, exclusive of primary area of concentration, in four of the following eight areas—ceramics, advanced drawing, advanced design, printmaking, painting, photography, sculpture, and visual communication.
   b. 15 hours to be taken in the primary area of concentration (except for photography and visual communication).

c. 21 hours for students concentrating in photography: Art 23, 24, 123 or 124, 181, 182, 205, 206.

d. 21 hours for students concentrating in visual communication: Art 163, 164, and five courses chosen in consultation with the advisor.

6. Nine additional hours of electives may be taken in the Art Department, except for students concentrating in photography and visual communication, who may take 6 hours of electives in the Art Department.

7. Transfer students must take a minimum of 12 credit hours of 100-level fine arts courses at this University, of which 9 hours must be in their area of specialization.

Bachelor of Arts with a combined major in art history and fine arts—The following requirements must be fulfilled in consultation with the departmental advisor:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. A total of 30 hours in art history and 30 hours in fine arts.

a. Art history: Art 31–32, 71 or 72, and one course in each of the following areas—ancient, medieval, Renaissance, seventeenth and eighteenth centuries, nineteenth and twentieth centuries; 6 hours of art history electives.

b. Fine arts: Art 21–22, 41–42. The remaining 18 hours may be in one area of concentration or a combination of areas.

Five-Year Bachelor of Arts/Master of Arts in the field of art therapy—A program leading to the B.A. in the field of fine arts or psychology and the M.A. in the field of art therapy. The program is described under the Department of Psychology.

Special Honors—For graduation with Special Honors, students must have attained, by the end of the junior year, a grade-point average of at least 3.5 in the major and 3.0 overall. No later than the beginning of the senior year, students should consult their advisor regarding eligibility and selection of an area of study and a director of the research or creative arts project.

Minor in art history—Required: 18 credit hours of courses in art history, chosen in consultation with the undergraduate advisor for art history.

Minor in fine arts—Required: 18 credit hours of general course work in fine arts or in an area of concentration selected from design, drawing, ceramics, photography, painting, printmaking, sculpture, or visual communication. Students in the general program should consult the undergraduate fine arts advisor. Those selecting a specific area should consult with an advisor in the area of concentration.

Combined minor in art history and fine arts—Required: 9–12 hours of course work in art history and 9–12 hours in fine arts, for a total of 21 hours. A program of study is developed in consultation with the undergraduate advisors in art history and fine arts.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

ART HISTORY

31–32 Survey of Western Art (3–3) Robinson and Staff
A foundation for further study in the history of art. Art 31: prehistoric to Gothic art. Art 32: proto-Renaissance to modern art. (Art 31 and 32—fall and spring)

71 Introduction to the Arts in America I (3) Bjelajac
Painting, sculpture, and architecture from the Colonial period to the Civil War. Emphasis on the political and cultural problem of formulating a national style and iconography. Major focus on Washington public art and architecture. (Fall)

72 Introduction to the Arts in America II (3) Bjelajac
Painting, sculpture, and architecture from the Realism of Homer and Eakins to feminist and postmodern art. Issues of the theory of an avant garde and government patronage and censorship. (Spring)

101 Greek Art and Archaeology (3) Hartswick
A survey of Greek sculpture, painting, and architecture, from the Dark Ages (ca. 1000 B.C.) through Alexander the Great (ca. 300 B.C.). Emphasis is on the stylistic development of Greek art and the interrelationships among sculptural technique and style, major changes in vase painting, and the refinements of architectural elements. (Fall)

102 **Roman Art and Archaeology** (3) Hartswick
A survey of Roman sculpture, painting, and architecture, from 300 B.C. (the Etruscans) to the end of the Constantinian Period (ca. 300 A.D.). The major artistic achievements of the Romans—portraiture, historical narratives—and the stylistic changes from the idealized and illusionistic to the realistic and abstract. (Spring)

103 **The Ancient Artist and His Workshop** (3) Hartswick and Staff
A study of the ancient craftsman's techniques, workshop organization, and position in society. Exploration of sculpture, architecture, painting, pottery, mosaics, gems, glass, and metalwork.

104 **Renaissance Art in Italy I** (3) Jacks
Early developments from the 13th to the 15th century. (Fall)

105 **Renaissance Art in Italy II** (3) Jacks
High Renaissance and Mannerism. (Spring)

106 **Renaissance Art in the North I** (3) von Barghahn
Northern painting from van Eyck through Bosch. (Fall)

107 **Renaissance Art in the North II** (3) von Barghahn
Northern painting and graphics from Durer through Brueghel. (Spring)

108 **18th-Century Art in Europe** (3) Bjelajac
Painting, sculpture, and architecture in France, Great Britain, and Italy. Emphasis on Watteau, Chardin, David, Hogarth, Gainsborough, Reynolds, Canaletto, and Tiepolo. (Spring)

109 **19th-Century Art in Europe I** (3) Robinson
Examination of Neoclassicism and Romanticism in the context of Western European political, social, and cultural developments. Emphasis on France, England, and Germany and the representative styles of David, Ingres, Delacroix, Turner, Constable, and Friedrich. (Fall)

110 **19th-Century Art in Europe II** (3) Robinson
Examination of the revolution in style of Realism, Impressionism, and Post-impressionism in the context of Western European political, social, and cultural developments. Emphasis on representative styles of Courbet, Manet, Monet, Morisot, Degas, Seurat, Cezanne, Van Gogh, and Gauguin. (Spring)

111 **Classical Archaeology** (3) Hartswick and Staff
Archaeological monuments of classical civilizations, with intensive study of one or more areas selected from architecture, sculpture, painting, or minor arts.

112 **Egypt and the Near East** (3) Hartswick and Staff
The great artistic tradition of the Nile Valley and the contemporary civilizations (ca. 3000 B.C. to after 1000 B.C.) between the rivers Tigris and Euphrates (present day Iraq) are explored. Emphasis on the Pyramid Age, the temples at Karnak and Luxor, the tombs of the Valley of the Kings, and the artistic traditions of the Sumerians, Akkadians, Babylonians, Assyrians, and Persians. (Fall)

113 **Baroque Art in the South** (3) von Barghahn
Tradition and innovation in Italian and Spanish art. Artists considered include Caravaggio, the Carracci, Borromini, Bernini, El Greco, Zurbaran, Ribera, Velasquez, and Murillo. (Spring)

114 **Baroque Art in the North** (3) von Barghahn
Concentration on France, Flanders, and Holland, with emphasis on Poussin, Rubens, Van Dyck, and Rembrandt. (Fall)

115 **Christian Iconography** (3) Staff
Origins and development of Christian symbols and themes from early Christian to the Council of Trent.

117 **Medieval Art I** (3) Anderson
Early Christian and Byzantine. (Fall)

118 **Medieval Art II** (3) Anderson
Romanesque and Gothic. (Spring)

119 **Islamic Religion and Art** (3) Nasr
Same as Rel 163.

121 **Spanish Art I** (3) von Barghahn
Discussion of areas selected from the art of ancient Iberia through the seventeenth century. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the content differs.

122 **Spanish Art II** (3) von Barghahn
Discussion of areas selected from the eighteenth through twentieth centuries. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the content differs.

129 **20th-Century Art in Europe** (3) Lader
Survey of 20th-century European painting, sculpture, and architecture, from their origins in the late 19th century through Surrealism. Emphasis on major modernist movements and artists, including Matisse, Picasso, Kandinsky, and Mondrian. (Fall)

130 **20th-Century Art in America** (3) Lader
Survey of 20th-century American painting and sculpture, focusing upon the avant garde. Emphasis on artists of the Stieglitz circle and later modernist movements such as Abstract Expressionism, Pop, Op, Minimal, and Conceptual art. Art 129 is recommended as preparation. (Spring)

145 **Folk Arts in America** (3) Staff
Ceramics, woodcarving, ironwork, decorative painting, weaving, and other crafts. Same as AmSt 145.

147 **Ancient Civilizations of Mexico and Latin America** (3) von Barghahn
Survey of Pre-Columbian art and architecture from prehistoric period to the Spanish conquest, including Yucatan and Central American regions.

148 **19th-Century American Art I: Age of Democratic Revolution** (3) Bjelajac
Contextual examination of painting and sculpture from the American Revolution to the Civil War, incorporating issues of national identity, democracy, religion, race and ethnicity, class and gender. (Fall)

149 **19th-Century American Art II: Origins of Modernism** (3) Bjelajac
Painting, sculpture, and photography from the Civil War to the Alfred Stieglitz group and the Armory show. Issues of women in the arts, the Arts and Crafts movement, the formation of an American avant garde, and African-Americans in the arts. (Spring)

150 **Internship in Art History** (3) Staff
Open to candidates for the B.A. in art history only and with the approval of advisor in art history. May not be repeated for credit toward the degree. May be taken *P/NP* only.

155 **Aegean Civilizations** (3) Hartswick
An introduction to the excavational and multidisciplinary aspects of classical archaeology. Minoan and Mycenaean civilizations (1700–1200 B.C.). Interrelationships between Greek and Persian cultures of the sixth and fifth centuries B.C.

156 **Medieval Sculpture** (3) Anderson
In-depth study of sculpture of Early Christian period, Carolingian era, or High Middle Ages. Seminar format.

161 **Studies in Renaissance Art** (3) Staff

162 **Principles of Museum Work** (3) Staff
Introduction to the history and development of museums; problems of museum administration, connoisseurship, cataloguing, installation, conservation, and educational service.

165 **African, Oceanic, and North American Indian Art** (3) von Barghahn
Survey of architecture, sculpture, and painting from ancient kingdoms to early 20th-century culture. Emphasis on imagery and iconography.

167 **The Dynastic Courts of Europe** (3) von Barghahn
Politics and royal patronage, 1400–1800. Areas may include France, Italy, Spain, Portugal, Austria, Germany, or Russia. Specific area announced in *Schedule of Classes*. May be repeated for credit if specific area is different.

169 **History of Decorative Arts: European Heritage** (3) Carson
Survey of changing styles of European furniture, textiles, ceramics, and glass, in the context of general trends in art history and changing patterns in economic, technological, social, and cultural history. From antiquity to the modern age. (Spring)

170 **History of Decorative Arts: American Heritage** (3) Carson
Examination of the decorative arts in America from the 17th century to the modern period. Exploration of changing visual characteristics in relation to the changing American experience. (Fall)

173 **History of the Cinema** (3) Staff
Same as EMda 173. Laboratory fee, $35.

176 **American Architecture** (3) Longstreth
Same as AmSt 175.

187 **East Asian Art** (3) Staff
Survey of the arts of China, Japan, and Korea.

188 **South Asian Art** (3) Staff
Survey of the arts of India, Pakistan, Sri Lanka, Nepal, and Tibet, from prehistoric times to circa 18th century.

191 **American Architecture** (3) Longstreth
Same as AmSt 176.

192 **The American Cinema** (3) Staff
Same as AmSt 192.

197 **History of Photography** (3) Lader

198 **Studies in Art History** (3) Staff
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

FINE ARTS

Note: Fine arts courses at the 100 level may be repeated for credit with approval of the department. Schedule of fees for Art 123–24: Ceramics—$75; 2-D Design—$24; 3-D Design—$27; Drawing—$75; Printmaking—$54; Sculpture—$35, Typography—$75; Oil and Acrylic Painting—none; Watercolor—$45; Photography—$100; Visual Communication—$100; Lithography—$54; Serigraphy—$75; Jewelry Design—$36; Bookbinding—$51.

21–22 **Design I: Basic** (3–3) Costigan, Stephanic
Required of all Fine Arts majors. Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. Art 21: Laboratory fee, $24. Art 22: Laboratory fee, $27. (Art 21 and 22—fall and spring)

23 **Photography I: Introduction** (3) Lake and Staff
Introduction to the principles of exposure and development of films and papers. Emphasis on creative expression. Laboratory fee, $100. (Fall and spring)

24 **Photography II** (3) Lake and Staff
Continuation of Art 23. Experimentation with black and white films and developers. Improvement of printing and exposure techniques. Emphasis on control for creative expression. Prerequisite: Art 23. Laboratory fee, $100. (Fall and spring)

41–42 **Drawing I** (3–3) Wright and Staff
Elementary investigation of concepts of drawing, both traditional and contemporary; training in perception, analysis of form in light and space; instruction in the use of graphic materials and media; exercises in connoisseurship. Material and model fee, $75 per semester. (Art 41 and 42—fall and spring)

51 **Introduction to Handbuilt Ceramics** (3) Ozdogan and Staff
Working with clay as an art form. Exploration of pinch, coil, slab, hump and press mold, paddling, and hollowing techniques. Sketch studies, reduction and oxidation kiln firings, clay and glaze making. Laboratory fee, $75, includes unlimited materials and use of tools. (Fall and spring)

52 **Introduction to Wheelthrown Ceramics** (3) Ozdogan and Staff
Development of cylindrical and open forms. Trimming, clay and glaze making, reduction and oxidation kiln firings. Sketch studies. Laboratory fee, $75, including unlimited materials and use of tools. (Fall and spring)

57 **Printmaking: Introduction to Relief and Planographic Techniques** (3) Staff
Exploration in monochrome and color of basic methods of these techniques, i.e., woodcut, composite relief, monotype, and lithography. Emphasis on aesthetic qualities of prints. Laboratory fee, $36. (Fall)

58 **Printmaking: Introduction to Intaglio and Stencil Techniques** (3) Staff
Exploration in monochrome and color of basic methods of these techniques, i.e., etching, engraving, collograph, stencil, and composite intaglio. Laboratory fee, $36. (Spring)

61–62 **Water Color** (3–3) Staff
Painting in transparent and opaque water color and in acrylic. Experimentation, figurative, and landscape. Laboratory fee, $45 per semester. (Academic year)

65–66 **Painting I** (3–3) Staff
Emphasis on personal expression with exposure to a variety of styles. Application of design principles to easel painting. Material and model fee, $45 per semester. (Academic year)

81–82 **Sculpture I** (3–3) Gates
Beginning study of design and fabrication of sculpture. Basic sculptural techniques for media, including clay, plaster, stone, and wood. Laboratory fee, $35 per semester. (Academic year)

123–24 **Individual Problems** (3–3) Staff
Emphasis on problems and materials of specific interest to the student in any area of Fine Arts. Laboratory fee depending on area chosen. Prerequisite: permission of instructor.

125–26 **Painting II** (3–3) Staff
Medium varies. Selected from oil, acrylic, and watercolor. Material and model fee, $45 per semester. (Academic year)

127–28 **Painting III** (3–3) Woodward
Studies in the interpretation of the figure and still life. Emphasis on color, space, planes, modulations. Alla prima and mixed techniques. Material and model fee, $45 per semester. (Academic year)

131 **Intermediate Ceramics: Wheelthrown Functional Forms** (3) Ozdogan and Staff
Aesthetic and technical development of wheelthrown functional ceramic forms. Exploration of attachments: lids, spouts, handles, and footing devices. Sketches and technical drawings, clay and glaze-making tests, varied temperature firings in reduction and oxidation atmospheres. Laboratory fee, $75. (Fall and spring)

132 **Intermediate Ceramics: Wheelthrown Nonfunctional Forms** (3) Ozdogan and Staff
Aesthetic and technical development of wheelthrown ceramic sculptural forms. Emphasis on section throwing, closed forms, and construction. Varied temperature firings in oxidation and reduction atmospheres. Clay and glaze making. Laboratory fee, $75. (Fall and spring)

133 **Ceramic Decoration** (3) Ozdogan
Aesthetic and technical development of surface decoration, with experimental projects in sgraffito, mishima, engobe, majolica, underglaze, overglaze, and relief techniques. Laboratory fee, $75.

134 **Nonsilver Printing Processes in Photography** (3) Staff
Introduction to nonsilver and archaic photographic processes. At least three processes will be explored. Emphasis on creative expression. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, $100. (Spring)

135–36 **Advanced Water Color** (3–3) Staff
Development of techniques of water color; concentration on special projects. Laboratory fee, $45 per semester. (Academic year)

137 **Workshop in Materials, Methods, and Techniques** (3) Woodward, Smith, and Staff
Technical investigation of painting methods from the 14th century to the present. Preparation of grounds, media, underpainting, glazing. Laboratory fee, $15. (Fall and spring)

138 **Printmaking: History and Practice** (3) Staff
Lecture survey through slides and original prints of the history of the fine art etching, engraving, woodcut, stencil, and lithograph. Laboratory demonstrations with student participation. This basic course is designed for artists, art historians, art dealers, appraisers, librarians, commercial artists, and collectors. There is no prerequisite. Laboratory fee, $24. (Summer)

139 **Problems in Color** (3) Costigan
Intensive exploration of the objective rationale and subjective experience of color through the execution of problems in color contrast and color scales. Prerequisite: Art 21. Laboratory fee, $18. (Spring)

141 **Interior Design** (3) Staff
Survey of basic interior design materials and techniques. Topics include floor plans and design, interior renderings, hard and soft materials, furniture styles. Laboratory fee, $21. (Fall)

142 **Interior Design Problems** (3) Staff
A theoretical and practical in-depth exploration of a specific area of interior design selected from furniture design, construction and restoration, history of furnishings, and interior rendering. Topic to be announced in the *Schedule of Classes*. Prerequisite: Art 141 or equivalent. Laboratory fee, $35. (Spring)

143–44 **Serigraphy** (3–3) Staff
Fine arts printmaking using serigraphic techniques. Utilization of all basic techniques; emphasis on aesthetic properties of prints. Laboratory fee, $75 per semester. (Academic year)

146 **Ceramic Restoration, Conservation, and Installation** (3) Ozdogan
Methods and techniques of restoration, conservation, and installation of pottery, sculptural ceramics, and architectural ceramics, with modular and mixed media attachments. Emphasis on repair according to museum and collector specifications, using permanent and temporary finishings. Laboratory fee, $75. (Summer)

151 **Ceramic History and Technology** (3) Staff
Emphasis on clay and glaze formulation and firing techniques, with related historical background. Laboratory fee, $75. (Fall)

152 **Ceramic Sculpture** (3) Ozdogan
Developing an understanding of the sculptural ceramic form that integrates both quality and creativity. Techniques in hollow and solid construction. Varied temperature firings in reduction and oxidation atmospheres. Laboratory fee, $75. (Fall)

153 **Printmaking: Intermediate Study of Intaglio and Relief Techniques** (3) Staff
Investigation in monochrome and color of these techniques, i.e., etching, engraving, woodcut, wood engraving, stencil, composite processes, and mixed media. Prerequisite: Art 57, 58. Laboratory fee, $36. (Fall)

154 **Printmaking: Introduction to Light-Sensitive Grounds** (3) Staff
Exploration of the use of grounds on copper that are sensitive to light for the purpose of etching. Printing in monochrome and color. Prerequisite: Art 153 or equivalent. Laboratory fee, $36. (Spring)

157–58 **Printmaking: Advanced Study of Intaglio and Relief Techniques** (3–3) Staff
Intensive exploration in monochrome and color of printmaking, etching, engraving, woodcut, wood engraving, stencil, collograph printing with light-sensitive grounds, composite techniques, and mixed media. Emphasis on utilization of techniques in developing a personal statement and style. Prerequisite: Art 153, 154, or equivalent. Laboratory fee, $36. (Fall and spring)

159–60 **Drawing II** (3–3) Wright and Staff
Study and application of master drawing techniques. Investigation of perspective and anatomy. Emphasis upon conceptual development of personal style. Material and model fee, $75 per semester. (Academic year)

163 **Visual Communication I: Basic Layout** (3) Molina and Staff
Layout stages, including basic formats, production processes; working with type and basic skills. Prerequisite: Art 171. Laboratory fee, $100

164 **Visual Communication II: Problem Solving** (3) Molina and Staff
Conceptual approach to problem solving. Various graphic design problems, including both small-format and large-format design in commercial and institutional graphics. Prerequisite: Art 163, 172. Laboratory fee, $100.

166 **Advanced Drawing Techniques** (3) Staff
Specific area announced in the *Schedule of Classes*. May be repeated for credit if the area covered is different. Laboratory fee: Art 166.10, $75; Art 166.11, $90.

168 **Intermediate Ceramic Design in Handbuilding** (3) Ozdogan
Further concentration in handbuilding techniques of pinch, coil, slab, hump and press mold, paddling, and hollowing. Sketch studies, clay and glaze tests. Orientation to studio operations and maintenance. Laboratory fee, $75. (Fall and spring)

171 **Typography I** (3) Molina and Staff
Basic calligraphy for traditional and contemporary use. Type theory, including specification, copy fitting, and study of letter form as used in graphic design. Laboratory fee, $100.

172 **Typography II** (3) Molina and Staff
Study of type classification, recognition, and adaptation. Methods of type specification, copy fitting, and typesetting processes. Typographic layout and alphabet design. Prerequisite: Art 171. Laboratory fee, $100.

174 **Visual Communication III: Computer Graphics** (3) Molina and Staff
Introduction to computer graphics in visual communication. The use of computers in the design process and as a tool for problem solving in graphic design. Laboratory fee, $100.

175 **Printmaking: Introduction to Lithography** (3) Barnhart
Study of planographic techniques and materials related to printing images from stones and metal litho plates. Prints in crayon, tonal washes, and multicolor. Laboratory fee, $54.

179–80 **Sculpture II** (3–3) Gates
Expansion of Sculpture I, utilizing advanced wood milling equipment and metal welding techniques. Prerequisite: Art 81–82. Laboratory fee, $35.

181 **Introduction to Color Photography** (3) Lake
Introduction to color through exposure and processing of color transparency films. Use of filters for creating and correcting color shifts, with emphasis on color as subject matter. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, $100. (Fall)

182 **Introduction to Photographic Lighting** (3) Staff
Introduction to various lighting techniques. Available light manipulation, studio lighting, and copy lighting will be explored. Emphasis on creative expression. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, $100. (Fall and spring)

183 **Experimental Photography** (3) Staff
Structured exploration of various photographic processes and techniques. Emphasis on creative expression. Content of course will vary; contact department for current offering. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, $100. (Fall and spring)

184 **Jewelry Design and Techniques** (3) Gates
Laboratory fee, $36. (Fall and summer)

186 **Portrait Painting and Drawing** (3) Staff
Model fee, $45.

189–90 **Sculpture III** (3–3) Gates
Advanced study in concepts and materials through creation of three-dimensional forms concentrating on relevance of scale and media. Relationship of sculpture to the environment. Prerequisite: Art 179–80. Laboratory fee, $35 per semester. (Academic year)

193 **Computer Design in the Fine Arts I** (3) Stephanic
Exploration of the use of computers as a visual arts medium. Topics include bitmapped painting, object-oriented drawing, Image scanning/manipulation, multimedia and Internet site design. Emphasis on creative expression. Laboratory fee, $100.

194 **Computer Design in the Fine Arts II** (3) Stephanic
Continuation of Art 193, with an emphasis on individual approach. Prerequisite: Art 193 or permission of instructor. Laboratory fee, $100.

BIOLOGICAL SCIENCES

Professors D.L. Atkins, R.K. Packer, R. Donaldson (*Chair*), T.L. Hufford, J.R. Burns, D.L. Lipscomb
Professorial Lecturer R.P. Eckerlin
Associate Professors R.E. Knowlton, H. Merchant, D.E. Johnson, K.M. Brown
Associate Professorial Lecturer P.E. Spiegler
Assistant Professors E.F. Wells, D.W. Morris, J.M. Clark, M.W. Allard, L.C. Smith, G. Hormiga, P.S. Herendeen

Bachelor of Arts with a major in biology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—BiSc 11–12 or equivalent.
3. Required courses in related areas: Chem 11–12; Chem 151–52 and 153–54. (The following courses are strongly recommended: Phys 1, 2, 5, and 6 or Phys 21, 22, 5, and 6. 3 credit hours of either mathematics or statistics; two years of an approved foreign language.)
4. Required courses for the major—A minimum of 24 credit hours of 100-level courses, which must include at least 4 hours from each of the following: cell and molecular biol-

ogy (BiSc 102 to 109), suborganismal biology (BiSc 110 to 128), organismal biology (BiSc 130 to 145), and ecology and evolution (BiSc 150 to 169).

Bachelor of Science with a major in biology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences
2. Prerequisite courses—BiSc 11–12 or equivalent.
3. Required courses in related areas—Chem 11–12; Chem 151–52 and 153–54; Phys 1, 2, 5, and 6; 3 credit hours of either mathematics or statistics (this requirement cannot be satisfied by waiver). Two years of an approved foreign language are strongly recommended but not required.
4. Required courses for the major—A minimum of 30 credit hours of 100-level courses, which must include at least 4 hours from each of the following: cell and molecular biology (BiSc 102 to 109), suborganismal biology (BiSc 110 to 128), organismal biology (BiSc 130 to 145), and ecology and evolution (BiSc 150 to 169).

A maximum of 6 credit hours of research and independent study or graduate courses in biological sciences may be used as electives within the major.

Special Honors—In addition to the general requirements stated under University Regulations, in order to be considered for graduation with special honors, a student must maintain a cumulative 3.5 grade-point average in biological science courses and at least a 3.0 cumulative overall grade-point average. Students who meet these criteria and wish to pursue special honors must complete an approved research project under faculty direction.

Minor in biology—12 credit hours of 100-level courses (excluding research and independent study).

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: BiSc 11–12 or equivalent is prerequisite to all 100-level courses except by permission of the instructor.

3–4 **Introductory Biology for Nonscience Majors (3–3)** Schiff
Lecture (2 hours), laboratory (2 hours). BiSc 3: Principles of cell biology; structure and function of plants and animals; animal behavior. BiSc 4: Human anatomy and physiology; genetics; evolution; ecology. It is recommended that BiSc 3 be taken before BiSc 4. Laboratory fee, $45 per semester. (Academic year)

11–12 **Introductory Biology for Science Majors (4–4)** Hufford
Lecture (3 hours), laboratory (3 hours). BiSc 11: Principles of cell and molecular biology, cell physiology, inheritance, and evolution. BiSc 12: Principles of organismic biology, including diversity, form and function of plants and animals, and ecology. Prerequisite to BiSc 12: BiSc 11. Laboratory fee, $55 per semester. (Academic year)

102 **Cell Biology (3)** Morris, Smith
Structure and function of biological molecules and cellular organelles; cellular interactions, cell differentiation. Prerequisite: one semester of organic chemistry. (Fall and spring)

103 **Cell Biochemistry (3)** Donaldson
Introduction to the metabolism of generalized cells of animals, plants, and microorganisms, including energetics, enzymes, respiration, biosyntheses, and regulatory mechanisms. Prerequisite: organic chemistry. (Fall)

104 **Cell Biochemistry Laboratory (1)** Donaldson
Designed to illustrate some of the principles and techniques of biochemical experimentation. Prerequisite or concurrent registration: BiSc 102 or 103. Laboratory fee, $55. (Fall)

105 **Plant Biochemistry (3)** Donaldson
Discussions of plant metabolism and molecular biology: photosynthesis, nitrogen metabolism, membrane transport, mechanisms of hormone action, protein targeting, biotechnology, and current research topics. Prerequisite: Chem 11–12. (Spring)

107 Genetics (3) Johnson
Introduction to genetics, with emphasis on the integration of transmission of genetic traits and the molecular basis of gene action. Also includes cytogenetics, gene regulation, and examples of current applications of genetic technology. (Fall and spring)

108 Genetics Laboratory (1) Johnson
Study of genetic principles and genetic and molecular techniques in Drosophila and *E. coli*. Prerequisite or concurrent registration: BiSc 107. Laboratory fee, $55. (Spring)

109 Advanced Genetics (3) Johnson
Emphasis on the use of genetic analysis in solving modern biological problems. Gene expression and its control; genes in development and oncogenes. Prerequisite: introductory course in genetics. (Spring, odd years)

110 Developmental Plant Anatomy (4) Hufford
Demonstration, observation, discussion (6 hours). Initiation and ontogeny of tissues and organs of vascular plants. Laboratory fee, $55. (Spring, odd years)

114 Developmental Biology (4) Brown
Lecture (2 hours), laboratory (4 hours). Embryonic development of animals. Principles are illustrated by modern experimental studies of developmental problems. Laboratory analysis of organ system formation in the frog, sea urchin, chick, and pig. Laboratory fee, $55. (Fall)

115 Experimental Developmental Biology (4) Brown
Lecture (2 hours), laboratory (4 hours). Biochemistry and cellular biology of development. Laboratory exercises involve micromanipulative and biochemical studies on embryos fertilized in the lab. Prerequisite: BiSc 114 or equivalent, or permission of instructor. Laboratory fee, $55. (Spring, odd years)

118 Histology (4) Burns
Lecture (2 hours), laboratory (4 hours). Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Laboratory fee, $55. (Spring)

120 Survey of Neurobiology (4) Atkins
Lecture (3 hours), laboratory (2 hours). Study of the gross and cellular anatomy, physiology, and biochemistry of the nervous system and its pathways; emphasis on mammals. Laboratory fee, $55. (Fall)

121 Comparative Endocrinology (4) Burns
Lecture (3 hours), laboratory (2 hours). Comparative study of basic principles of chemical integration, neuroendocrine relationships, and mechanisms of hormone action. Prerequisite: BiSc 118 or 122. Laboratory fee, $55. (Fall)

122 Human Physiology (3) Packer
Introduction to the function of organ systems of the human body. Prerequisite: Chem 11–12. (Spring)

123 Human Physiology Laboratory (1) Staff
Study of basic physiology laboratory techniques; emphasis on the experimental study of homeostatic mechanisms in humans. Prerequisite or concurrent registration: BiSc 122. Laboratory fee, $55. (Spring)

125 Environmental Physiology (3) Packer
Mechanisms of evolutionary adaptation and processes of acclimation by which animals respond to environmental challenges; emphasis on vertebrates. Prerequisite: BiSc 122 or 154. (Fall)

128 Human Nutrition (3) Staff
Dietary requirements and their underlying physiological and biochemical bases; composition of natural and modified foodstuffs and additives; social and economic aspects of nutrition. (Spring)

130 Invertebrate Zoology (4) Knowlton
Lecture (3 hours), laboratory (3 hours). General survey of invertebrate animals, including classification, morphology, physiology, embryology, and evolutionary relationships among phyla. Laboratory fee, $55. (Fall)

132 Comparative Vertebrate Anatomy (4) Atkins
Lecture (2 hours), laboratory (4 hours). Evolution and comparative morphology of Phylum Chordata, stressing recent forms. Laboratory fee, $55. (Spring)

137 Introductory Microbiology (4) Morris
Lecture (2 hours), laboratory (4 hours). Survey of the major groups of microorganisms with emphasis on structure, physiology, ecology, phylogenetic rela-

tionships, and biotechnology. Prerequisite: one year of chemistry. Laboratory fee, $55. (Fall)

139 **Parasitology** (4) Eckerlin
Lecture (2 hours), laboratory (4 hours). Introduction to animal parasitology, survey of parasitic types from protozoa through arthropods. Laboratory fee, $55. (Fall)

140 **Taxonomy of Flowering Plants** (4) Wells
Lecture (2 hours), laboratory and field (4 hours). Origin, evolutionary development, and principles of systematics of flowering plants. Laboratory fee, $55. (Spring)

142 **Flora of the Mid-Atlantic States** (4) Wells
Field trips and laboratory study of the identification and ecology of vascular plants of the Coastal Plain, Piedmont, and mountains of Delaware, Maryland, Virginia, and West Virginia. Emphasis on family characteristics and recognition of dominant species in native habitats. Laboratory fee, $55. (Summer)

145 **Ornithology** (4) Staff
Lecture (2 hours), laboratory and field (4 hours). An introduction to the study of birds from an ecological perspective. Includes several short field trips, two full-day Saturday trips for waterfowl and migrants, and one evening field trip for owls. Laboratory fee, $55. (Spring)

150 **Organic Evolution** (3) Lipscomb
Synthetic theory of organic evolution, including population biology, speciation, adaptation, macroevolution, systematics, biogeography, and the geologic record. (Fall)

151 **History of Life** (3) Lipscomb
A review of the origin of life, the geologic record, and the evolutionary history of the major groups of organisms, including the evolution of bacteria, origin of animals and plants, evolution of invertebrates and vertebrates, adaptations of mammals, and the evolution of flowering plants. (Spring)

152 **Animal Behavior** (3) Staff
An evolutionary approach to the study of animal behavior, emphasizing behavioral ecology and sociobiology. (Spring)

154 **General Ecology** (4) Merchant
Lecture (3 hours), laboratory and field (3 hours). Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels, and energy transfer and their relationship to the structure and function of population, species, communities, and ecosystems. Laboratory fee, $55. (Fall)

155 **Plant Ecology** (4) Wells
Lecture (2 hours), laboratory (4 hours). Introduction to the dynamics of plant populations, communities, and individuals. Two weekend field trips required. Laboratory fee, $55. (Fall, odd years)

156 **Animal Ecology** (4) Merchant
Lecture (3 hours), laboratory and field (3 hours). Application of ecological principles to the understanding and manipulation of animal populations. Prerequisite: BiSc 154 or permission of instructor. Laboratory fee, $55. (Spring, even years)

157 **Aquatic Ecology** (4) Merchant
Lecture (3 hours), laboratory and field (3 hours). Ecological principles applied to aquatic systems with special references to physiochemical properties, typical habitats, and communities. Laboratory fee, $55. (Spring, odd years)

158 **Field Botany** (4) Wells
Lecture (2 hours), laboratory and field (4 hours). Field and laboratory studies on local flora. Two weekend field trips required. Laboratory fee, $55. (Fall)

167 **Marine Biology** (4) Knowlton
Lecture (2 hours), laboratory (4 hours), plus some extended field trips. Study of relationships between organisms and physical, chemical, and biological factors of the marine environment. Consideration of the open ocean and coastal ecosystems and human influences on them. Laboratory fee, $55. (Spring)

168 **Tropical Marine Biology** (4) Burns, Knowlton, Packer, Smith
Study of relationships between organisms and physical, chemical, and biological factors in a tropical marine-estuarine environment, conducted through ecological fieldwork in characteristic tropical ecosystems on the island of San Salvador, Bahamas. Recommended: BiSc 122 and/or 167. Laboratory fee, $55. (Summer, even years)

169 **Applied Marine Ecology** (4) Knowlton
Field study of interactions among biotic and abiotic components of temperate-boreal ecosystems, with emphasis on human impacts and utilization of coastal resources, conducted through surveys of ecosystems along the Maine coast. Recommended: BiSc 130 and/or 167. Laboratory fee, $55. (Summer, odd years)

171 **Undergraduate Research** (arr.) Staff
Admission by permission of the staff member concerned. May be repeated for credit. Prerequisite: Chem 50 or 152; 16 credit hours in biological science courses. Laboratory fee, $50 per credit hour. (Fall and spring)

172 **Independent Study in Cell and Molecular Biology** (2) Donaldson, Morris
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

173 **Independent Study in Developmental Biology** (2) Brown, Burns
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

174 **Independent Study in Organismic Biology** (2) Atkins, Knowlton, Wells, Packer
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

175 **Independent Study in Genetic and Evolutionary Biology** (2) Allard, Johnson, Lipscomb
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

176 **Independent Study in Environmental Biology** (2) Hufford, Merchant
Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

BUSINESS ADMINISTRATION

Requirements for the Bachelor of Business Administration degree are listed under the School of Business and Public Management. The courses listed below form the business core for the B.B.A. degree. Several of these courses are required in the B.Accy. degree as well. BAdm courses are taught by faculty members schoolwide.

1–2 **First-Year Development Course** (0–0) Askari, Graff
Required of all first-year students in SBPM. This two-semester noncredit course is designed to assure that students meet required technical proficiencies and formulate both a personal study and development plan. The course meets periodically during the semester. Course fee, $75 per semester.

51 **Introductory Financial Accounting** (3) Kumar, Patterson
Basic knowledge of financial accounting concepts and standards as an essential part of the decision-making process for the management of private investment and for business and government organizations. Same as Accy 51. Prerequisite: sophomore standing. (Fall and spring)

52 **Introductory Managerial Accounting** (3) Kumar and Staff
Basic knowledge of managerial accounting concepts, procedures, analyses, and internal reports as an essential part of the decision-making process for public and private-sector organizations. Prerequisite: Accy/BAdm 51. (Fall and spring)

53 **Management, Organizations, and Society** (1.5) Staff
Introduction to the manager and the management process in the context of organizations and society. Focus on effective management of the corporation in a changing society. (Fall)

54 **Information Systems: Applications and Technology** (1.5) Granger, Liebowitz
An introduction to data and information processing concepts, with emphasis on uses and applications in business. Emphasis is on the wide-ranging effects of technology and information systems within a business organization. (Fall and spring)

55 **Fundamentals of Business Law** (1.5) Kane
Overview of the American legal system. Key legal concepts such as contracts and torts. The role of courts, regulation, litigation, and constitution issues. (Spring)

56 **Group Dynamics** (1.5) Lobuts
An introduction to the behavior and development of people within an organization as they work in groups. Examples and cases illustrate the various concepts and theories discussed. Prerequisite: Psyc 12 or permission of instructor. (Spring)

110 **Basic Marketing Management** (3) Achrol, Maddox, Hassan, Liebrenz-Himes, Rau, Jacobina
Role of marketing in the socioeconomic system; consumer behavior, analysis; impact of consumerism. Major decision areas of product planning, pricing, and distribution; tools of marketing research and demand analysis. Prerequisite: Econ 12; Stat 51. (Fall and spring)

115 **Financial Management and Markets** (3) Handorf and Staff
Introduction to financial markets, investment analysis, and financial management. Financial analysis, risk management, working capital management, capital budgeting, financial structure, cost of capital, and dividend policy. (Fall and spring)

120 **Production Management** (3) Birou, Perry, Bagchi
Production planning concepts and analytical tools. Designing and managing production processes: facilities, equipment, process control systems. Design issues, demand forecasting, material planning, acquisition techniques. Managing the factory floor: scheduling, total quality management, continuous improvement concepts and methods. Prerequisite: Stat 51. (Fall and spring)

125 **Management Information Systems** (1.5) Granger, Artz
This course introduces the student to information systems as viewed from a contemporary management perspective. Current and emerging managerial issues that have the potential to reshape the form and function of future management information systems. Prerequisite: BAdm 54. (Fall and spring)

130 **Human Resource Management** (3) D. Cohen, Swiercz, McHugh
How human resource management policies and practices affect the achievement of corporate objectives: human resource planning, recruitment, selection, training, development, compensation, and unionism and collective bargaining. Prerequisite: BAdm 56 or permission of instructor. (Fall and spring)

135 **Diversity, Design, and Development in Global Organization** (1.5) Staff
An exploration of the forces of change that will drive organization adaptations in the 21st century. Consideration of both the underlying phenomena and design implications for the organization life cycle, technology changes, globalization, competition drivers, and increasing service requirements. (Spring)

140 **Financial Statement Analysis** (1.5) Kumar
Basic introduction to the analysis of financial statements. The role of accounting procedure choices on reported numbers and adjustments that facilitate comparative analysis; interpretation of financial statements in terms of industry economics and firm strategies. Prerequisite: BAdm 51, 52. (Fall)

145 **International Financial Environment** (1.5) Rehman, Yang
Assessment of international economic and financial developments as they affect international corporate activity. Conceptual issues and current developments in the international financial environment, including an overview of international economic systems, international financial systems, and global financial markets. Prerequisite: Econ 12. (Fall)

150 **Business and Government Relations** (3) Beales, Burke
Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. Restricted to seniors in the B.B.A. and B.Accy. programs. (Fall and spring)

190 **Special Topics** (1 to 3) Staff
Experimental offering; new course topics and teaching methods. May be repeated for credit.

195 **Internship** (0)
SBPM undergraduates may register for this course when they wish to have an internship recorded on the transcript. The supervisor must verify that the internship has been completed for a minimum of six hours per week. A $25 administrative fee is charged. May be repeated each semester if desired.

197 **Strategy Formulation and Implementation** (3) Davis, Thurman, Cook, Starik, Burke, Kim
An integrative capstone course to develop skills in diagnosing organizational problems, formulating and selecting strategic alternatives, and recognizing

problems inherent in strategy implementation. Restricted to seniors in the B.B.A. and B.Accy. programs. (Fall and spring)

199 **Independent Study** (1 to 6) Staff
Assigned topics with interdisciplinary focus. Admission by prior permission of advisor. May be repeated once for credit.

CHEMISTRY

Professors T.P. Perros, W.E. Schmidt, N. Filipescu, E.A. Caress, D.A. Rowley, D. Ramaker, M. King (*Chair*), A. Montaser, J.H. Miller
Associate Professor A. Vertes
Assistant Professors D.A. Knight, M.J. Wagner, R.M. Tarkka, S. Barone
Instructor J. Hilderbrandt

Bachelor of Arts or Bachelor of Science with a major in chemistry—The department offers three undergraduate majors, all designed to give students a broad background in the basic divisions of chemistry: analytical, inorganic, organic, and physical. Major I, while providing considerable concentration in chemistry, permits a wider selection of electives. It thus should meet the needs of students preparing to enter medicine, dentistry, or related fields. Major II is intended primarily for students preparing for graduate study in chemistry or those planning to enter the chemical profession and wishing to be certified by the American Chemical Society as having met the minimum requirements for professional training. Major III is a program in forensic chemistry and prepares students to meet the needs of federal and state forensic sciences laboratories.

The following requirements must be fulfilled:

1. Students in Major I, II, and III must meet the general requirements stated under Columbian School of Arts and Sciences.

2. Prerequisite courses for the Bachelor of Arts degree for Major I and Major II and Bachelor of Science degree for Major III—Chem 11–12 or Honr 33–34; Chem 22 and 23; required courses in related fields—Math 31 and 32, Phys 21–22 and 5–6. Major I and II Bachelor of Science degree candidates must also take BiSc 11–12 or a year of other approved course work in the natural sciences or mathematics.

3. (a) Required courses for Major I—Chem 111–12, 113, 122, 134 or 235, 141, 151–52, and 153–54.

(b) Required courses for Major II—Chem 111–12, 113, 122, 123, 141, 151–52, 153–54, 195 (for 3 credits), 235; one approved advanced course of at least 3 credits in chemistry or a related field. Required courses in related fields for Major II—a course in a structured computer programming language, such as Stat 129 or CSci 51.

(c) Required courses for Major III—Chem 111–12, 113, 122, 134 or 235, 141, 151–52, and 153–54. Required courses in related fields for Major III—BiSc 11–12; ForS 224, 225, 269, 273, and 280.

An entering student who is considering chemistry as a major is strongly encouraged to consult a Chemistry Department advisor regarding the program of study for the first two years. In general, the following sequence of courses is recommended for those students considering Major II: first year—Chem 11–12 or Honr 33–34, Math 31 and 32 (or 30 and 31 if necessary), English composition, electives; second year—Chem 22 and 23, 151–52, and 153–54, Phys 21–22 and 5–6, Math 32 if not taken in first year, electives; third year—Chem 111–12, 113, and 141, computer programming, electives; fourth year—Chem 122, 123, 235, 195, one advanced course in chemistry or a related field, electives. Major I and Major III students should follow this sequence in general and are urged to consult with the chemistry and premedical advisors concerning their academic programs.

Special Honors—In addition to meeting the general requirements stated under University Regulations, a candidate for graduation with Special Honors in chemistry must maintain a cumulative 3.0 grade-point average in chemistry courses and take Chem 195 for at least 3 credits over two semesters.

Five-Year Bachelor of Science/Master of Science in the field of chemical toxicology—A program leading to the B.S. in the field of chemistry and M.S. in the field of chemical toxicology. The first three years of the program consist of undergraduate course work. Application for admission to the M.S. program in chemical toxicology will be made during the second semester of the third year; for admission to the graduate portion of the program, acceptance must be obtained prior to the start of the fourth year of the program. If acceptance into the M.S. program in chemical toxicology is not desired or not obtained, the requirements for the B.S./B.A. in chemistry (Major I, II, or III) may be fulfilled by the

successful completion of appropriate courses during the fourth year of study. If acceptance into the M.S. program in chemical toxicology is obtained, the B.S. in chemistry will be awarded after the successful completion of the fourth year of the program.

The following requirements must be fulfilled.

1. Students must meet the general requirements stated under Columbian School of Arts and Sciences. (See the Graduate Programs Bulletin also.)

2. Course requirements: Chem 11–12, 22 and 23, 111–12, 113, 122, 123, 141, 151–52, 153–54, 195, 235; Phys 21–22 and 5–6; BiSc 11–12; Math 31, 32, Stat 127 and a course in a structured computer programming language; Phar 203; Bioc 221–22, Phvl 191; ForS 240, 245, and 242 or 270; either ForS or Chem 299–300; and two courses chosen from ForS 246, 248, 249, 269.

Minor in Chemistry—Required: Chem 11–12 or Honr 33–34; Chem 22 and 23, 50, and 110 or 111; Chem 151–52 and 153–54 may be substituted for Chem 50.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: Upon consultation with course instructors, specific course prerequisites may be waived. Chem 11–12 and Honr 33–34 are related in their subject matter, and credit for only one of these sets of courses can be earned toward a degree.

PHYSICAL SCIENCE

3–4 **Contemporary Science for Nonscience Majors (3–3)** Filipescu
Contemporary topics in physical, biological, and medical science. Chem 3 is not prerequisite to Chem 4. Laboratory fee, $40 per semester. (Academic year)

CHEMISTRY

11–12 **General Chemistry (4–4)** Perros, Hilderbrandt, Rowley, Wagner, Barone
Atomic structure and properties; stoichiometry; gas, liquid, and solid state; chemical bonding; solutions; chemical kinetics and equilibria; thermodynamics; acids and bases; electrochemistry; descriptive chemistry. Prerequisite to Chem 11: one year of high school algebra. Prerequisite to Chem 12: Chem 11. Laboratory fee, $50 per semester. (Chem 11 and 12—fall and spring)

22 **Introductory Quantitative Analysis (3)** Vertes
Theory and practice of quantitative analysis by modern methods; evaluation of analytical data emphasizing detection and correction of experimental errors. Correlated with Chem 23. Prerequisite: Chem 12. (Fall)

23 **Introductory Quantitative Analysis Laboratory (2)** Vertes, Barone, Schmidt
Laboratory complement to Chem 22. Prerequisite or concurrent registration: Chem 22. Laboratory fee, $50. (Fall and spring)

50 **Introduction to Organic Chemistry (4)** Caress, King, Tarkka
Lecture (3 hours), laboratory (3 hours). A one-semester course for students in other disciplines. This course does not fulfill the organic chemistry requirement for chemistry majors or premedical students. Credit may not be earned for both Chem 50 and Chem 151–52. Prerequisite: Chem 12. Laboratory fee, $50. (Spring, odd years)

105 **Environmental Chemistry (3)** Miller
Chemistry and physics of the environment, with emphasis on water and air pollution, environmental analysis and modeling and their limitations. (Fall)

110 **Introduction to Physical Chemistry (3)** Ramaker
Gas, solid, and liquid state, chemical thermodynamics, solutions, chemical equilibrium, kinetics, quantum chemistry, spectroscopy, and macromolecules. Prerequisite: Chem 22; Math 31; Phys 2 or 22; or permission of instructor. Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 111–12 or an equivalent course. (Fall, odd years)

111–12 **Physical Chemistry (3–3)** Ramaker, Wagner, Miller
Gas laws, chemical thermodynamics, chemical equilibrium, kinetics, quantum chemistry, atomic and molecular spectra, structure of solids, liquids, and macromolecules. Prerequisite to Chem 111: Chem 22 and 23, Math 31, Phys 22; or permission of instructor. Prerequisite to Chem 112: Chem 111. (Academic year)

113 Physical Chemistry Laboratory (2) Miller, Wagner, and Staff
Laboratory complement to Chem 111. Prerequisite or concurrent registration: Chem 111. Laboratory fee, $50. (Spring)

122 Instrumental Analytical Chemistry (3) Montaser
Theory of instrumental methods in qualitative and quantitative analysis, determination of structure, with emphasis on atomic and molecular spectrophotometry, infrared spectroscopy, nuclear magnetic resonance, mass spectrometry, chromatography, and electroanalysis. Correlated with Chem 123. Prerequisite or concurrent registration: Chem 111 or permission of instructor. (Fall)

123 Instrumental Analytical Chemistry Laboratory (2) Wagner, Vertes
Laboratory complement to Chem 122. Prerequisite or concurrent registration: Chem 111 and 122. Laboratory fee, $50. (Fall)

134 Descriptive Inorganic Chemistry (2) Staff
Intermediate-level course emphasizing the descriptive chemistry of the elements. Prerequisite: Chem 22, 23, and 152. (Spring)

141 Experimental Chemistry (3) Knight, Tarkka
Experimental methods common to all disciplines of chemistry. Use of the chemical literature; operation of chromatographic and spectroscopic instrumentation; interpretation of spectra by correlation methods. Prerequisite: Chem 152 and 154. Laboratory fee, $50. (Fall and spring)

142 Advanced Experimental Chemistry (2) Knight, Tarkka
Advanced laboratory techniques. Emphasis on individual work and on sophisticated laboratory procedures for preparation, separation, and characterization of compounds and determination of their physical properties. Prerequisite: Chem 111 and 141. Laboratory fee, $50. (Spring)

151–52 Organic Chemistry (3–3) King, Tarkka, Caress
Systematic treatment of the structure, preparation, properties, and reactions of the principal classes of organic compounds. Fundamental principles of stereochemistry, reaction mechanisms, and spectroscopic methods of analysis. Credit may not be earned for both Chem 50 and Chem 151–52. Prerequisite to Chem 151: Chem 12. Prerequisite to Chem 152: Chem 151. (Academic year)

153–54 Organic Chemistry Laboratory (1–1) King and Staff
Laboratory complement of Chem 151–52. Introduction to and practice in basic skills of synthesis, separation, purification, and identification of organic compounds. Prerequisite or concurrent registration: Chem 151–52. Prerequisite to Chem 154: Chem 153. Laboratory fee, $50 per semester. (Academic year)

191 History of Chemistry (2 or 3) Staff
Historical development of chemistry from antiquity to the 20th century. Prerequisite: Chem 12. (Fall)

193 Chemical Instrumentation (3) Montaser
Electronic analog measurements and control of electrical quantities in chemical instrumentation; digital and analog data conversion and optimization of electronic measurements in chemical instrumentation; computer interfacing and programming using PC-based systems. Prerequisite: Chem 112 and 123. Laboratory fee, $30. (Fall)

195 Undergraduate Research (1 or 2) Staff
Research on problems approved by the staff. Approval must be obtained prior to registration. A final written report on the work is required. For students requesting Special Honors in chemistry, a poster or oral presentation is also required. May be repeated once for credit. Majors are encouraged to take the course for two semesters. Laboratory fee, $50. (Fall and spring)

CHINESE

See **East Asian Languages and Literatures.**

CIVIL, MECHANICAL, AND ENVIRONMENTAL ENGINEERING

Professors H. Liebowitz, T.G. Toridis (*Chair*), K. Mahmood, M.K. Myers, R.E. Kaufman, C.M. Gilmore, J.L. Whitesides, V. Klein (*Research*), D.L. Jones, C.A. Garris, J.D.-Y. Lee, R.H. Tolson, I.H. Shames, S. Sarkani, K.H. Digges (*Research*), R. Sandusky, M.I. Haque, C.F. Scheffey
Adjunct Professors B.W. Hannah, B. Whang, D.D. Moran, M.O. Critchfield, M. Yachnis

Professorial Lecturers J.I. Bregman, W.J. Boettinger, G.C. Everstine, J.A. Sprague, F. Farassat, A. Kehnemui, C.R. Hauer, J.L. Thomas, J.M. McMichael, P.A. Cooper, S.M. Joshi, E. Safak, J. Hardin, J. Juang, I. Raju
Associate Professors N.E. Bedewi, A. Eskandarian (*Research*), C. Mavriplis, Y.-L. Shen
Adjunct Associate Professor F. Bandak
Associate Professorial Lecturers R.Y.-Y. Ting, K. Khozeimeh, S.L. Zimmerman, T.K. O'Brien, H. Ahmady, A.R. Johnson, J.M. Luckring, A. Tessler, A. Auslander, C. Gerhold
Assistant Professors A.D. Cutler, R. Riffat, M.T. Manzari
Assistant Professorial Lecturers R. Lee, T.L. Walton, Jr., G.E. Hicho, S. Feng, E.A. Morelli

See the School of Engineering and Applied Science for the programs of study leading to the Bachelor of Science (Civil Engineering) and Bachelor of Science (Mechanical Engineering).

CIVIL ENGINEERING

117 Engineering Computations (3) Mahmood and Staff
Numerical methods for engineering applications. Methods for solving systems of linear equations, root finding, curve fitting, and data approximation. Numerical differentiation and integration and numerical solution of differential equations. Compuer applications. Prerequisite: CSci 50. Sames as ME 117. (Fall)

120 Introduction to the Mechanics of Solids (3) Sarkani and Staff
Stress and strain, axial load problems, torsion, shear force and bending moment, pure bending of beams, shearing stresses in beams, compound stresses, analysis of plane stress and plane strain, combined stresses, deflection of beams, statically indeterminate problems, columns, energy methods. Prerequisite: ApSc 57, 113. (Fall and spring)

121 Structural Theory I (3) Sarkani and Staff
Theory of statically determinate structures; stability and determinacy, influence lines and moving loads. Analysis of roof systems and cable structures. Calculation of deflections. Approximate methods of analysis of indeterminate structures. Prerequisite or concurrent registration: CE 120. (Fall)

122 Structural Theory II (3) Sarkani and Staff
Theory of statically indeterminate structures using matrix methods and classical approaches such as moment distribution and slope-deflection, influence lines; energy methods. Prerequisite: CE 121. (Spring)

166 Materials Engineering (2) Gilmore and Staff
Mechanical properties, plastic deformation dislocation theory, yielding, strengthening mechanisms, microstructure and properties, heat treatment of steel, composites, amorphous materials, viscoelastic deformation, creep, fracture, fatigue, fatigue crack propagation. Prerequisite: ApSc 130, concurrent registration: CE 120. (Fall)

167 Mechanics of Materials Laboratory (1) Gilmore and Staff
Measurement of strains and study of failure resulting from applied forces in ductile, brittle, anisotropic, elastomeric, plastic, and composite materials. Study of tension, compression, bending, impact, and shear failures. Prerequisite or concurrent registration: CE 166. (Fall)

168 Introduction to Geotechnical Engineering (3) Manzari and Staff
Soils and rock formation, soil composition, permeability, seepage and flow net analysis, stresses in soil medium, consolidation and settlement, shear strength of soil, analysis of lateral earth pressures, soil compaction. Prerequisite: CE 120, ME 126. (Fall)

185 Geotechnical Engineering Laboratory (1) Manzari and Staff
Laboratory experiments to evaluate liquid and plastic limits, grain-size distribution, shear strength, compressibility, permeability, and moisture–density relationship of soils. Prerequisite: CE 168. (Fall)

188 Hydraulics Laboratory (1) Mahmood and Staff
Laboratory experiments and demonstrations for stability of floating bodies, Bernoulli's theorem, velocity, and pressure measurements in pipe and flume. (Spring)

189 Environmental Engineering Laboratory (1) Riffat and Staff
Laboratory experiments for physical–chemical analysis related to water quality, sludge, and sewage disposal. (Fall)

190 **Contracts and Specifications** (2) Staff
Law of contracts, construction contracts, specifications, bidding, insurance and bonds, professional liability, arbitration of disputes, litigation. (Spring)

191 **Metal Structures** (3) Toridis and Staff
Principles of the design of metal structures, structural elements, connections, specific problems of analysis, methods of construction, professionalism in design. A design project, including the use of computer software and a detailed report, is required. Prerequisite or concurrent registration: CE 122. (Fall)

192 **Reinforced Concrete Structures** (3) Toridis and Staff
Properties of concrete and reinforcement; design of shear reinforcement; development of reinforcement; design of columns, floor slabs and building frames; ethics and professionalism in design. A design project, including the use of computer software and a detailed report, is required. Prerequisite or concurrent registration: CE 122. (Spring)

193 **Hydraulics** (3) Mahmood and Staff
Fluid statics: pressure forces, buoyancy, and flotation. Application of kinematic principles; flow fields, stream tubes, and flow nets. Fluid dynamics: applications to pipe flow, hydraulic models, measurement of pressure, and velocity. Open channel flow: applications to water resources engineering. Prerequisite: ME 126. (Spring)

194 **Environmental Engineering I: Water Resources and Water Quality** (3) Riffat and Staff
Introduction to available water resources. Methods of evaluating water quality and characteristics. Design of water treatment plants involving coagulation, flocculation, filtration, and clarification. Prerequisite or concurrent registration: CE 193. (Spring)

195 **Hydrology and Hydraulic Design** (3) Haque and Staff
Descriptive hydrology: hydrologic cycle, precipitation, stream flow, evaporation, and transpiration. Quantitative hydrology: hydrograph analysis, hydrographs of basin outflow, storage routing. Probability concepts in hydrology: flood frequency, rainfall frequency, stochastic hydrology. Culverts and stilling basins. Prerequisite or concurrent registration: ApSc 115, CE 193. (Fall)

196 **Design and Cost Analysis of Civil Engineering Structures** (3) Toridis and Staff
Total structural systems concepts. Design of civil engineering structures such as piers, wharves, bulkheads, offshore platforms, dams, and other special structures. Principles of cost analysis for timber, steel, and reinforced concrete structures. Project and report are required. Prerequisite: senior status. (Spring)

197 **Environmental Engineering II: Water Supply and Pollution Control** (3) Riffat and Staff
Water sources and their development. Water distribution and wastewater collection systems, including applied hydraulics of pipelines and pumps. Physical, chemical, and biological treatment of water and wastewater. Planning to meet quality needs and regulatory requirements. Course requirements include four periods of laboratory work. Prerequisite: CE 194. (Fall)

198 **Research** (1 to 3) Staff
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

MECHANICAL ENGINEERING

117 **Engineering Computations** (3) Mahmood and Staff
Numerical methods for engineering applications. Methods for solving systems of linear equations, root finding, curve fitting, and data approximation. Numerical differentiation and integration and numerical solution of differential equations. Computer applications. Prerequisite: CSci 50. Same as CE 117. (Fall)

120 **Methods of Engineering Experimentation** (2) Jones and Staff
Acquisition and analysis of experimental data. Laws of modeling and simulation. Report formulation and presentation. Basic principles of measuring instruments and sensors. Fundamentals of digital data acquisition and use of computer-based data systems. Strain gages, oscilloscopes, transducers, and computerized data systems. Prerequisite: ME 117. (Spring)

126 **Fluid Mechanics I** (3) Garris, Mavriplis, Shames
Fluid properties, fluid statics, integral and differential formulations of conservation of mass, momentum, and energy. Bernoulli's equation. Dimensional

analysis and similitude. Inviscid flow. Viscous flow. Experimental and computational methods in fluid mechanics. Prerequisite: ApSc 58. (Fall)

131 **Thermodynamics** (3) Staff
Fundamental thermodynamic concepts. Zeroth law of thermodynamics, work and heat, first law of thermodynamics, properties of pure substances, first-law analysis, second law of thermodynamics, reversibility, entropy, second-law analysis of thermodynamic systems. Prerequisite: Phys 41. (Fall)

134 **Introduction to Vibration Analysis** (3) Garris, Lee
Natural frequencies, free vibration, forced vibration. Unbalance, whirling, vibration isolation. Measuring techniques and application of computers in vibration analysis. Multiple degrees of freedom. Dynamic vibration absorbers. Shock and transient vibration. Prerequisite: ApSc 58. (Spring)

149 **Thermal Systems Design** (3) Staff
Completion of a thermal systems design project that requires integration of the engineering science background, economics, reliability, safety, ethics, professional responsibility, and social considerations. Work includes development and use of design methodology, optimization, feasibility considerations, detailed system descriptions, and presentation of results. Prerequisite: ME 187. (Fall)

152 **Mechanical Engineering Laboratory** (2) Garris and Staff
Project-oriented course. Simulates working environment of professional engineers. Projects are assigned in student's areas of interest, student is expected to design and assemble own experiments. Extensive use of instrumentation and computing facilities. Project proposal, progress reports, final report, and periodic oral presentations required. Prerequisite: ME 120. (Spring)

155 **Fluid Mechanics II** (3) Garris and Staff
Potential flow theory. Boundary-layer theory. Drag on immersed bodies: form drag and skin friction. Turbulence. Compressible flow: acoustic speed, Mach number, isentropic flow, nozzle flow, normal and oblique shock phenomena, Raleigh and Fanno flows. Experimental and computational methods. Prerequisite: ME 126, 131. (Fall)

182 **Electromechanical Control System Design** (3) Bedewi, Lee
Application of control theory to the design of electromechanical systems. Transducers, valves, and other control components. Mathematical models of open- and closed-loop electromechanical systems. Root locus and frequency response methods; application to the synthesis of feedback systems by both manual and computer-aided techniques. Prerequisite: ApSc 114; ME 117, 134. (Fall)

187 **Heat Transfer** (3) Staff
Steady- and unsteady-state heat conduction problems. Analytical and numerical solution methods. Convective heat transfer, boundary-layer approach, analogy between heat and momentum transfer. Thermal radiation: fundamental concepts and laws. Heat-exchanger design. Prerequisite: ME 126, 131. (Spring)

189 **Mechanical Engineering Design** (3) Jones and Staff
Design of gears, belt drives, chains, brakes, clutches, couplings, flywheels, and shafts. Preparation of a design project requiring interactions between mechanical and energy systems; the project includes a preliminary design, prototype development and evaluation, and design optimization. Prerequisite: ME 187, 193; concurrent registration: ME 195 and 196. (Spring)

190 **Analysis and Synthesis of Mechanisms** (3) Kaufman and Staff
Kinematics and dynamics of mechanisms. Displacements, velocities, and accelerations in linkage, cam, and gear systems by analytical, graphical, and computer methods. Synthesis of linkages to meet prescribed performance requirements. Prerequisite: ApSc 58. (Spring)

191 **Mechanical Design** (3) Kaufman and Staff
Integration of knowledge of strength of materials in a design context. Stresses and deflections in engineering structures. Theories of failure. Introduction to the design of mechanical components, such as fasteners, shafts, springs. Introduction to the use of computers in mechanical engineering design. Prerequisite: CE 120, ME 117. (Spring)

192 **Manufacturing Processes and Systems** (3) Shen and Staff
Introduction to manufacturing techniques for metals, polymers, ceramics, and composites. Relationships between properties of materials and techniques for processing them. Process selection, design, control, and integration. Computer-

integrated manufacturing, robotics and assembly automation. Prerequisite: junior status or permission of instructor. (Fall)

193 **Engineering Systems Design** (3) Kaufman and Staff
Creative engineering design, problem definition, and concept generation. Design of journal and roller element bearings, fasteners and permanent joints, and springs. Design project incorporating design selection, and optimization. Project presentation using graphical and computer resources. Prerequisite: ME 191. (Fall)

195 **Computer-Aided Engineering of Mechanical Systems** (3) Jones and Staff
Presentation of the major elements of computer-aided engineering systems: interactive computer graphics, finite element analysis, and design optimization. Consideration of economics, safety, and reliability factors. Prerequisite: ME 193; concurrent registration: ME 196. (Spring)

196 **Computer-Aided Engineering Laboratory** (1) Jones and Staff
Instruction and hands-on applications of computer-aided engineering systems to the design, analysis, and optimization of mechanical engineering components and systems. Concurrent registration: ME 195. (Spring)

197 **Robotic Systems Design and Applications** (3) Bedewi and Staff
Modeling and analysis of robot designs. Kinematics, statics, and dynamics of linkages. Design and selection of mechanical structures, actuators, transmissions, and sensors. Design of robotic control systems. Relevant computer hardware and software. Industrial applications and limitations of robot systems. Lab experiments. Same as EE 192. Prerequisite: ME 182. (Spring)

198 **Research** (1 to 3) Staff
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

199 **Student Design Project** (1 to 3) Staff
Special student projects involving extensive design of various mechanical engineering systems. Examples include the solar car, mini-Baja, or other design competitions that typically are national in scope. May be taken for graduate credit by graduate students. (As arranged)

ENGINEERING SCIENCE

1 **Engineering Orientation** (2) Jones, Martin
Introduction to careers in engineering and computer sciences, University resources, and computer skill development. Emphasizes teamwork skills by applying them to several design projects. (Fall)

4 **Engineering Drawing and Computer Graphics** (3) Jones, Shen, and Staff
Introduction to technical drawing, including use of instruments, lettering, geometric construction, sketching, orthographic projection, section and auxiliary views, dimensioning, pictorial drawing, and intersections and developments. Introduction to computer graphics, including topics covered in manual drawing, and computer-aided drafting. (Fall and spring)

CLASSICS

Professor J.E. Ziolkowski
Associate Professor E.A. Fisher (*Chair*)
Assistant Professors M.D. Ticktin, Y.M. Moses, C.E. Dexter
Lecturers H. Javadi, S.S. Montasser, B.A. Fiedler, D.J. Mehall

Bachelor of Arts with a major in classical humanities—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Latn or Grek 1–2, 3–4, or equivalent, and Clas 71, 72. (Hmn 1 may be taken in place of either Clas 71 or 72.)
3. Required courses in the major—(a) 12 credit hours selected from 100-level Latn, Grek, or approved classical studies courses; (b) 18 credit hours selected from Art 101, 102, 103, 111, 112, 155; Hist 105, 107, 108, 109, 110, 111, 209; Ling 101; Phil 111; PS 105; Rel 143.

Minor in classical humanities—(a) 6 credit hours selected from Latn or Grek 1–2; (b) 9 credit hours selected from Latn or Grek 3–4, 103, 104; Clas 71, 72, 105, 107, 108, 11

127, 170, 185, 186; (c) 6 credit hours selected from Art 101, 102, 103, 111; Hist 105, 107, 108, 109, 110.

ARABIC

1–2 First-Year Arabic (4–4) Staff
Fundamentals of speaking, understanding, reading, and writing of Modern Standard Arabic. Laboratory fee, $50 per semester. (Academic year)

3–4 Second-Year Arabic (4–4) Staff
Continuation of Arab 1–2. Further development of speaking, understanding, reading, and writing skills of Modern Standard Arabic. Prerequisite: Arab 1–2 or equivalent. Laboratory fee, $50 per semester. (Academic year)

9–10 Third-Year Arabic (3–3) Staff
Continuation of Arab 3–4. Further development of speaking, understanding, reading and writing skills of Modern Standard Arabic. Prerequisite: Arab 3–4 or equivalent. Laboratory fee, $50 per semester. (Academic year)

103 Modern Arabic Literature—Nonfiction (3) Staff
Practice and continued development of language skills, utilizing articles from current newspapers, magazines, journals, plus SCOLA broadcasts and video presentations. Prerequisite: Arab 3–4 or permission of instructor. Laboratory fee, $50. (Fall)

104 Modern Arabic Literature—Fiction (3) Staff
Study of selected fiction in Modern Standard Arabic. Practice and continued development of language skills; short essay writing. Prerequisite: Arab 103 or equivalent and permission of instructor. Laboratory fee, $50. (Spring)

GREEK

1–2 Beginning Greek: Classical (3–3) Fisher
Study of the grammar, vocabulary, and structure of ancient Greek. Reading of selected ancient authors. (Alternate academic years)

3–4 Intermediate Greek: Classical (3–3) Staff
Reading of ancient Greek prose or poetic works (e.g., selections from Homer, Plato, Euripides). Review of grammar. Prerequisite: Grek 1–2 or equivalent. (Alternate academic years)

103–4 Major Greek Authors (3–3) Staff
Selections from a wide variety of Greek prose, drama, and poetry, suited to the needs of the class. May be repeated for credit with permission of instructor. Prerequisite: Grek 4 or equivalent. (Academic year)

HEBREW

1–2 Beginning Hebrew (4–4) Moses
An active presentation of Hebrew as it is spoken and written today. Comprehension, speaking, reading, and writing skills are stressed. Laboratory fee, $50 per semester. (Academic year)

3–4 Intermediate Hebrew (4–4) Staff
Further development of skills in speaking, reading, writing, and comprehension of modern Hebrew. Texts range from Israeli newspaper items to selections from classical materials. Prerequisite: Hebr 1–2 or equivalent. Laboratory fee, $50 per semester. (Academic year)

103 Modern Hebrew Nonfiction (3) Moses
Directed readings in humanities and social sciences. Development of linguistic skills necessary for independent research. May be repeated for credit. Prerequisite: Hebr 4 or permission of instructor. (Fall)

104 Modern Hebrew Fiction (3) Moses
Study of selected modern Israeli short stories and poems. Prerequisite: Hebr 103 or permission of instructor. (Spring)

106 The Israeli Media (3) Moses
Explores the Israeli press, television and radio news broadcasts in Hebrew; focuses on developing increasing proficiency in reading and aural comprehension through class discussions and written assignments in Hebrew. Prerequisite: Hebr 103 or permission of instructor. (Spring)

120–21 **Advanced Hebrew Literature** (3–3) Ticktin
Selections from Hebrew literature throughout the ages: Bible, Rabbinics, medieval Hebrew literature; classical motifs in modern Israeli literature. Literary analysis (writing and discussion) in Hebrew. Prerequisite: Hebr 104 or permission of instructor.

LATIN

1–2 **Beginning Latin** (3–3) Ziolkowski
Grammatical essentials of Latin, appropriate reading selections, development of English derivatives, introduction to Roman life and literature. (Academic year)

3 **Intermediate Latin: Prose and Poetry** (3) Staff
Development of ability to read and understand Latin literature of moderate difficulty. Prerequisite: Latn 1–2 or equivalent. (Fall)

4 **Vergil's Aeneid** (3) Staff
Significant passages of Vergil's famous epic in Latin; reading and discussion of the entire poem in translation. Prerequisite: Latn 3 or permission of instructor. (Spring)

103–4 **Major Latin Authors** (3–3) Staff
Selections from one or two major authors will be read each semester. May be repeated for credit. Prerequisite: Latn 3, 4; or permission of instructor. (Academic year)

YIDDISH

1–2 **Yiddish for Reading and Conversation** (3–3) Ticktin
Grammatical essentials of the language, appropriate reading selections, conversational exercises for beginners. (Alternate academic years)

CLASSICAL STUDIES

63 **Greek and Latin Origins of Medical Terms** (3) Staff
Mastery of medical terminology by learning word elements from Greek and Latin and the principles that govern both the formation of medical words and the derivation of their meanings. (Fall)

71 **Greek Literature and Civilization** (3) Staff
Study of ancient Greek civilization with focus on public and private life as seen primarily through literature. (Fall)

72 **Roman Literature and Civilization** (3) Staff
Study of Roman civilization with focus on public and private life as seen primarily through literature. (Spring)

81 **Classical Islamic Literature** (3) Javadi
A survey of pre-modern Islamic literature, including translations of poetry, prose, popular literature, and selections from the Quran. Topics such as mysticism, court literature, travel literature, urban mercantile literature, etc., are explored from the Arabic tradition as well as from the Persian and Turkish Ottoman traditions.

82 **Modern Middle Eastern Literature** (3) Javadi
20th-century literature of the Middle East (prose, poetry, short stories, novels), beginning with its 19th-century modernization and emphasizing various themes (e.g., alienation, exile, etc.).

100 **Modern Hebrew Literary Classics** (3) Ticktin
Prose and poetry of a century of writing from the beginning of the Hebrew literary renaissance to contemporary Israeli literature, including works of Bialik, Agnon, Hazaz, Amichai, Oz, and Yehoshua. Discussions stress historical development and authors' treatments of tradition and modernity.

101 **Israeli Society and Culture: Literary Perspectives** (3) Ticktin
A study of literature reflecting such contemporary issues as the conflict between the "builders' generation" and their children; the cultural contacts of Ashkenazim and Sefardim; image of the Arab; impact of the Holocaust; Zionist ideals and current realities. (Fall)

102 **Contemporary Israeli Short Stories and Poetry** (3) Ticktin
An introduction to post-1948 writers, including A.B. Yehoshua, Amos Oz, David Shahar, Aharon Apfelfeld, Dahlia Ravikovitch, Yehuda Amichai, Haim Gury, Amir Gilboa, and Amalia Kahana-Karmon. (Spring)

105 **Special Topics** (3) Staff
Topics in Arabic, Greek, Hebrew, Roman, and Yiddish literature; topics announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

107 **Greek and Roman Mythology** (3) Staff
The creation of the world, the nature of the gods, and the adventures of heroes as described in various Greek and Roman literary sources (e.g., epic, drama, hymns) and as shown in ancient art. (Fall)

108 **Approaches to Classical Mythology** (3) Staff
Selected myths examined through various disciplinary approaches, such as archaeology, psychology, history, comparative literature, and women's studies. Prerequisite: Clas 107 or equivalent. (Spring)

113 **Greek and Roman Drama** (3) Staff
Study of Greek and Roman tragedy and comedy; the nature and setting of dramatic performance in classical antiquity.

127 **Classical Influence on Western Civilization** (3) Ziolkowski
A survey of Greek and Roman influence on Western civilization, especially in architecture, language, literature, and science. Prerequisite: a course in classical literature or history.

170 **Issues of Gender in Classical Antiquity** (3) Staff
In-depth study and discussion of readings from ancient and modern sources on women and gender difference in Greek and Roman society.

185–86 **Directed Project** (1, 2, or 3) Staff
Individual advanced reading or research, to be arranged with a member of the faculty. May be repeated for credit. Admission by permission of instructor and department.

CLINICAL LABORATORY SCIENCE

Information on the Bachelor of Science in Health Sciences in the field of clinical laboratory science is available from the School of Medicine and Health Sciences.

COLUMBIAN SCHOOL ADVISING WORKSHOP

The Columbian School Advising Workshop is open only to Columbian School freshmen. In addition to a faculty member who serves as the workshop leader, each workshop has a team that includes a member of the University's professional or administrative staff and a student peer advisor.

1 **Freshman Advising Workshop** (0) Moreland and Staff
Participatory and informational sessions required for entering freshmen, designed to integrate students into Columbian School and the University by providing an introduction to the liberal arts and sciences, promoting effective participation in a richly diverse academic community, and encouraging an enlightened self-sufficiency in the selection of courses and majors.

COMMUNICATION

Professor C. Warren (*Chair*)
Assistant Professors K.K. Riley, R. Berko *(Visiting)*
Assistant Professorial Lecturers P. Frecknall, P. McKenzie, L. Schmidt, J. Hanweck, R. McKelvy, G. Selby

Enrollment in the communication major is restricted; please contact the program office for details. Comm 40 or 41 must be completed before requesting enrollment in the major.

Bachelor of Arts with a major in communication—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Required courses in the major: Comm 40, 41, 100, 110, 150, 199; 18 additional hours of 100-level courses in communication, as approved by the major advisor.

3. Required courses in related areas: 15 credit hours of 100-level courses in one other department, program, or field of study, as approved by the major advisor.

Minor in communication—18 credit hours of communication courses, including Comm 40, 41, 120, and 150.

40 Public Communication (3) Schmidt, McKelvy, Frecknall
Study and practice of the basic techniques of public speaking used to inform and persuade audiences. Emphasis on the speech-building process: research, composition, organization, style, delivery, and criticism.

41 Interpersonal Communication (3) Berko, McKenzie
Study and practice of the role of verbal and nonverbal communication in ritual, information and perspective sharing, problem solving, and relationship formation, maintenance, and dissolution. Designed to raise awareness of the complexity and power of the communication process in daily life and to help students develop their interpersonal skills cognitively, affectively, and behaviorally.

42 Business and Professional Speaking (3) Hanweck
Study of the communication process in business and professional organizations; practice in interviewing, small group communication, and speeches for special occasions. For non-majors and non-minors only.

100 Communication Theory (3) Riley, Berko
Inquiry into the nature and function of communication theory as a framework for the study of communicative behavior. Emphasis is placed on analysis of paradigmatic approaches in rhetorical, interpersonal, and mass communication theories and models, and on examination of contemporary research literature in communication.

110 Research Methods (3) Selby
Processes of inquiry within interpersonal and public communication. Students are introduced to concepts of framing research questions, conducting literature reviews, developing a research design, and interpreting results of research in communication. Prerequisite: Comm 100.

120 Small Group Communication (3) Warren
The study and practice of communication in small groups, focusing on problem solving, norms, roles, and leadership. Prerequisite: Comm 41 or permission of the instructor.

150 Persuasion (3) Warren
In-depth study of the principles and techniques of persuasion from both production and consumption perspectives, in both personal and mediated contexts. Emphasis on the common-premise model, with consideration of such topic areas as artistic and scientific approaches, pathos/ethos/logos, attitude and behavior change, effectiveness, ethics, and subconscious influence.

160 Origins of Contemporary Rhetorical Theory (3) Staff
Study of rhetorical theory and method as they evolved in the Western world from the classical period to the present.

170 Organizational Communication (3) Warren
Exploration of the philosophy, process, problems, and potential of human communication within organizational contexts. May involve experiential workshops and fieldwork. Suggested prerequisite: Comm 41 or 120 or permission of instructor.

172 Health Communication (3) Staff
Exploration of the nature, functions, and impact of relational communication in the context of health care. Both formal (health care organizations) and informal (family communication) systems may be studied. Topics can include provider–patient interaction, media and health, confirmatory communication. Prerequisite: Comm 100 or permission of instructor.

180 Communication Criticism (3) Warren, Riley
Evaluation of communication paradigms along critical dimensions of analysis. Prerequisite: Comm 40 or 150 or permission of instructor.

190 Selected Topics (3) Staff
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

196 Independent Study (1 to 3) Staff
Independent research and special projects. Open to seniors or exceptional well-prepared juniors majoring in communication. Before students are permitted to register, they must submit a written proposal of the plan of study and

obtain approval of the faculty member who will direct the study and of the program chair.

197 **Internship** (3) Staff
For communication majors. Student-secured internships in communication-related organizations. Students spend at least 15 hours per week doing communication-related work in a public or private organization. Seminars, meetings, reports, and/or term paper may be required by supervising instructor. Admission requires prior program approval.

199 **Senior Seminar** (3) Warren, Riley
Capstone course limited to communication majors. Selected reading and discussion. Each student works on an individually designed research project throughout the term, the results of which will be presented in a major paper. Prerequisite: Comm 110.

COMPUTER SCIENCE

See **Electrical Engineering and Computer Science.**

COUNSELING / HUMAN AND ORGANIZATIONAL STUDIES

Programs in counseling are offered at the graduate level by the Graduate School of Education and Human Development through its Department of Counseling Human and Organizational Studies. The following courses are available to undergraduates.

COUNSELING

162 **Professional and Ethical Orientation to Counseling** (3) Heddesheimer, Kelly, Marotta, Hudson
The roles and functions of a professional counselor and the ethical standards that govern the profession. (Fall, spring, and summer)

163 **Psychosocial Adjustment** (3) Hoare
Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Fall)

175 **Introduction to Rehabilitation Counseling** (3) Garcia
Overview of rehabilitation profession, including philosophy, history, ethics, theory, legislation, settings, and practice. (Fall)

178 **Disability and Case Management** (3) Linkowski and Staff
Case management services for persons with physical, mental, and emotional disabilities. (Spring)

181 **Medical and Psychosocial Aspects of Disabilities** (3) Garcia
Chronic and traumatic disorders with rehabilitation and psychosocial implications. (Fall)

CRIMINAL JUSTICE

See **Sociology.**

DANCE and DRAMA

See **Theatre and Dance.**

DRAMATIC LITERATURE

Committee on Dramatic Literature
N.C. Garner (*Chair*), R.L. Combs, G. Paster, W.A. Pucilowsky, S. Wolf

Columbian School of Arts and Sciences offers an interdisciplinary program in dramatic literature leading to the degree of Bachelor of Arts. This major, which combines the strengths of the Departments of English and of Theatre and Dance, is designed to give equal consideration to the two key aspects of theatre—the literary text and the production.

Bachelor of Arts with a major in dramatic literature—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Engl 51–52 or 61–62 or 71–72, 73–74, or 91–92; or Hmn 1, 2,

3. Required courses for the major (42 credit hours):
(a) Engl 120, 127–28; Engl/TrDa 124; TrDa 145–46
(b) 12 credit hours in drama courses or related topics selected from Anth 191/TrDa 140; Clas 113; Engl 105, 108, 155, 156, 157, 158, 165, 166; Mus 121, Fren Span 132.
(c) 12 credit hours in performance and production courses in the Department of Theatre and Dance, including TrDa 14, 130, 147.

EARLY MODERN EUROPEAN STUDIES

Committee on Early Modern European Studies
R.E. Kennedy, Jr. (*Chair*), I. Azar, C.A. Linden, J.A. Quitslund, L.F. Robinson, R.H. Schlagel, D. Wallace

Columbian School of Arts and Sciences offers an interdisciplinary program in Early Modern European Studies. This humanities program is designed to enhance the student's understanding of the history, philosophy, religion, science, literature, and art of the five centuries (1300–1800) during which the Western world began to take on some of its modern dimensions. The program is directed by an interdepartmental committee.

Bachelor of Arts with a major in early modern European studies—The following requirements must be fulfilled.
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Requirements for the major:
(a) Hmn 2; Phil 112; Rel 145; PSc 106.
(b) 6 credit hours of second-group French, German, or Spanish literature courses taught in the language, from among the following: Fren 120, 121, 122, 123; Ger 171; Span 121, 122–23, 124.
(c) 18 credit hours of art history, history, and English literature, with the course distribution to be determined in consultation with the program advisor, and with a minimum of 6 hours from each of the following groups: Art 104–5, 106–7, 108, 113–14, 121–22; Engl 125, 127–28, 130, 131–32; Hist 121, 122, 123, 141, 148, 151, 153, 154.

EAST ASIAN LANGUAGES AND LITERATURES

Professors J. Chaves (*Chair*), Y.-K. Kim-Renaud
Associate Professors D.L. Lee, G.C.Y. Wang
Associate Professorial Lecturer M.-J.C. Loh
Assistant Professors S. Hamano, I.L. Hanami
Adjunct Assistant Professor M. Frost
Assistant Professorial Lecturer E. Wang
Instructor T. Kimura

Bachelor of Arts with a major in Chinese language and literature—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Chin 5–6 (preferred); or Chin 1–2, 3–4.
3. Required for the major—Chin 11–12, 107–8, 109–10, and 6 hours selected from Chin 161, 163–64; plus 12 additional credit hours of 100-level Chinese courses.

Bachelor of Arts with a major in Japanese language and literature—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Japn 1–2, 3–4; or equivalent.
3. Required for the major—Japn 7–8, 111–12, 199–200; 15 hours selected from Japn 107–8, 109–10, 162, 185–86, 9 hours in related courses outside department (e.g., Art 18[illegible] Econ 170; Hist 127, 189, 195, 196; PSc 175; Rel 160).

Minor in Chinese language and literature—Prerequisite: 18–22 credit hours, including *either* Chin 1–2, 3–4, and 11 *or* Chin 5–6 and 11. The minor consists of 12 additional credit hours selected from Chin 12, 107–8, 109–10, 123–24, 161, 163–64, and 179–80.

Minor in Japanese language and literature—Prerequisite: Japn 1–2, 3–4; or equivalent. The minor consists of Japn 7–8 and 12 additional credit hours selected from Japn 107–8, 109–10, 111–12, 162, 185–86, and 199–200.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

CHINESE

1–2 Basic Chinese (4–4) Wang
Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, $50 per semester. (Academic year)

3–4 Basic Chinese (4–4) Wang
Continuation of grammar, with emphasis on speaking, reading, and writing. Laboratory fee, $50 per semester. (Academic year)

5–6 Intensive Basic Chinese (8–8) Lee
Intensive beginner's course in fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, $70 per semester. (Academic year)

10 Chinese Calligraphy (1) Loh
Writing of Chinese characters with traditional writing implements. No knowledge of the language required. May be repeated for credit. (Fall and spring)

11–12 Intensive Intermediate Chinese (6–6) Wang
Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Prerequisite to Chin 11: Chin 6. Laboratory fee, $70 per semester. (Academic year)

22 Intermediate Chinese Conversation (3) Staff
A practical course for improving speaking ability. Prerequisite: 6 credit hours of Chinese or equivalent. May be repeated for credit. Laboratory fee, $50. (Fall and spring)

107–8 Readings in Modern Chinese (3–3) Lee
Readings in selected modern literary works, social science materials, and documentary materials. Prerequisite: Chin 12 or equivalent. (Academic year)

109–10 Introduction to Classical Chinese (3–3) Chaves
Introduction to classical writings in Chinese literature, history, and philosophy. Prerequisite: Chin 6. (Alternate academic years)

123–24 Introduction to Chinese Linguistics (3–3) Lee
Introduction to the history of the Chinese language. Analysis of linguistic structure of modern spoken Chinese and classical Chinese. Lectures and discussion in English. Prerequisite: Chin 6 or equivalent, or a course in linguistics. (Alternate academic years)

136 Chinese Women in Myth, Literature, and Film (3) Frost
Women's position in Chinese cultural and political life from prehistoric myth to the present time. Confucian writing, traditional theatre, and films and novels set in China. A general survey of Chinese history establishes the context for discussions of cultural and political phenomena, such as foot binding and the one-child policy. Same as WStu 136.

161 Chinese Culture Through Film (3) Frost
Survey of the Chinese cultural heritage presented through films. Topics include literature, philosophy, art, religion, and social history from prehistorical times to the modern era. Lectures and discussion in English. (Fall and spring)

163–64 Chinese Literature in Translation (3–3) Chaves
An introductory course focusing on major works of poetry, drama, and the novel in their historical and social context. (Academic year)

179–80 20th-Century Chinese Literature (3–3) Staff
Works of Lu Xun, Lao She, and others. Drama of Tian Han and Cao Yu. Prerequisite: Chin 107 or equivalent. (Alternate academic years)

185–86 Directed Reading (3–3) Staff
Reading of material in the student's field of interest. Admission by permission of instructor. (Academic year)

199 Proseminar: Readings for the Major in Chinese Language and Literature (3) Staff
Admission by permission of instructor. May be repeated for credit.

JAPANESE

1–2 Basic Japanese (4–4) Hamano and Staff
Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, $50 per semester. (Academic year)

3–4 Basic Japanese (4–4) Hamano and Staff
Continuation of grammar, with emphasis on speaking, reading, and writing. Laboratory fee, $50 per semester. (Academic year)

5–6 Intermediate Japanese (3–3) Staff
Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, $50 per semester. (Academic year)

7–8 Intermediate Japanese (3–3) Hamano, Hanami
Continuation of reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, $50 per semester. (Academic year)

9–10 Intensive Basic Japanese (8–8) Staff
Intensive beginner's course in fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, $70 per semester. (Academic year)

107–8 Readings in Modern Japanese (3–3) Hamano, Hanami
Readings in selected modern literary works, social science materials, and documentary materials. Prerequisite: Japn 8 or equivalent. (Academic year)

109–10 Introduction to Classical Japanese (3–3) Hanami
Introduction to classical writings in Japanese literature, history, and philosophy. Prerequisite: Japn 8; Japn 109 is prerequisite to Japn 110. (Academic year)

111–12 Japanese Literature in Translation (3–3) Chaves
An introductory survey of traditional and modern Japanese literature read in English translation: love and nature poetry; theater (classical drama, puppet plays); fiction; diaries. (Academic year)

162 Japanese Culture Through Film (3) Hanami
Survey of the Japanese cultural heritage presented through films. Topics include literature, philosophy, art, religion, and social history from prehistorical times to the modern era. Lectures and discussion in English. (Spring)

185–86 Directed Reading (3–3) Hanami and Staff
Reading of material in the student's field of interest. Admission by permission of instructor. (Academic year)

199 Proseminar: Readings for the Major in Japanese Language and Literature (3) Staff
Admission by permission of instructor. May be repeated for credit.

KOREAN

1–2 Basic Korean (4–4) Kim-Renaud
Fundamentals of grammar and pronunciation, with graded speaking, reading, and writing practice. Laboratory fee, $50 per semester. (Academic year)

3–4 Basic Korean (4–4) Kim-Renaud
Continuation of grammar, with emphasis on speaking, reading, and writing. Laboratory fee, $50 per semester. (Academic year)

5–6 Intermediate Korean (3–3) Kim-Renaud
Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, $50 per semester. (Academic year)

7–8 Intermediate Korean (3–3) Kim-Renaud
Continuation of reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, $50 per semester. (Academic year)

VIETNAMESE

1–2 Basic Vietnamese (4–4) Staff
Fundamentals of grammar and pronunciation, with an introduction to reading and writing. (Academic year)

3–4 Basic Vietnamese (4–4) Staff
Continuation of grammar, with emphasis on speaking, reading, and writing. (Academic year)

EAST ASIAN STUDIES

Program Committee: B. Dickson (*Director*), A. Bowie, J. Chaves, Y.-K. Kim-Renaud, J. Kuipers, E. McCord, S. McHale, D. Shambaugh, M. Whyte, D. Yang, A. Zhao

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in East Asian studies (with a focus on either China or Japan).

Bachelor of Arts with a major in East Asian studies—The following requirements must be fulfilled.

1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Common Curriculum Requirements.
3. Required courses for the major—Econ 169 or 170; three courses selected from Hist 118, 187, 188, 189, 195, or 196; IAff 91; two courses selected from PSc 170, 173, 175 or Soc 182; and three 100-level courses related to either China or Japan, selected in consultation with the program director.
4. With advance approval of the program director, students with a 3.5 grade-point average in their junior year may elect to write a senior research thesis for 3 to 6 credits in their senior year as part of their additional related course work.

Students should consult the program guidelines available from the Elliott School for courses pertinent to East Asian studies. Students should consult the program director concerning certain Special Topics or Selected Topics courses that may also be part of this program.

ECONOMICS

Professors J. Aschheim, J.L. Gastwirth, M.A. Holman, R.M. Dunn, Jr., S.E. Haber, R.S. Goldfarb, A.M. Yezer, J.J. Cordes (*Chair*), J. Pelzman, J.E. Kwoka, R.P. Trost, B.L. Boulier, H.S. Watson, M.D. Bradley, J.R. Millar, S.C. Smith, A. Klamer (*Research*), P. Labadie
Adjunct Professors J. Hardt, E.H. Solomon, T.F. Carroll, P. Swamy, D.J. Rousslang, K. Flamm, S.N. Kirby
Associate Professors R.F. Phillips, A.S. Malik, F.L. Joutz, M.O. Moore, S.M. Suranovic, S. Joshi
Adjunct Associate Professor M.A. Baily
Assistant Professors V. Fon, N. Vonortas, S. Reeves, A. Zhao, E.M. Feasel, S. Jain, C.M. Snyder, D. Ribar

Bachelor of Arts with a major in economics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. **Prerequisite courses—Econ 11–12.**
3. Required courses in related areas—Math 52, or equivalent, Stat 111 and 112, or equivalent; 6 credit hours of a social science other than economics (Hist 39–40 or 71–72 are recommended) or Phil 51–52.
4. **Required courses in the major—Econ 101, 102, 121, 198, and five additional 100-**level economics courses to be approved by the departmental advisor. Grades of *C–* or better are required in Econ 101 and 102. A maximum of three regional courses (Econ 133, 169, 170, 185) can be counted toward the five additional courses.

Bachelor of Science with a major in economics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Econ 11–12.
3. Required courses in related areas—Math 31 and 32, or equivalent; Stat 111 and 112, or equivalent; 6 hours of additional course work in mathematics, statistics, computer science, or operations research, to be approved by the departmental advisor (e.g., Math 33, 124, 125, 142; Stat 157, 158, 181, 183; OR 101, 102; Econ 214, 215, 275)
4. Required courses in the major—Econ 101, 102, 121, 123, 198, and four additional 100-level economics courses to be approved by the departmental advisor. Grades of *C–* or better are required in Econ 101 and 102. A maximum of three regional courses (Econ 133, 169, 170, 185) can be counted toward the four additional courses.

Five-Year Bachelor of Science with a major in economics and Master of Arts in the field of economics—Students interested in this joint degree program should consult the undergraduate program advisor and the M.A. program advisor as soon as possible. Timely completion of requirements should allow the student to receive both degrees within five years.

Bachelor of Science with a major in economics—The following requirements must be fulfilled:

1. All requirements listed under the Bachelor of Science degree with a major in economics. It is desirable that students complete Math 31 and 32 (or an equivalent sequence), Stat 111 and 112 (or an equivalent sequence), and Econ 101 and 102 by the end of their fifth semester. During their sixth semester, students should begin the process of applying to the M.A. program.

2. Econ 203–4 and 205, microeconomic and macroeconomic theory.

Master of Arts in the field of economics—Required: Econ 206, 275, and six electives chosen from graduate courses in economics and successful completion of the Master's Comprehensive Examination in economic theory. See the Graduate Programs Bulletin.

Five-Year Bachelor of Science with a major in economics and Master of Science in the field of engineering management—Interested students should contact the Economics Department's undergraduate program advisor early in their studies to discuss the requirements of the combined degree program. Application to the graduate portion of the program is ordinarily made to the School of Engineering and Applied Science after the fifth semester, and students must be accepted for the graduate portion of the combined degree prior to the start of the seventh semester in the program.

Bachelor of Science with a major in economics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.

2. Prerequisite courses—Econ 11–12 (for students in this combined degree program, Econ 11–12 fulfill the social science requirement of the general requirements).

3. Required courses in related areas—Math 31, 32, and 33; Stat 111, 112, 129, and 157.

4. Required courses in the major—Econ 101, 102, 121, 123, 160, 198, and three additional 100-level economics courses.

5. Required courses in engineering management—EMgt 211, 212, 269 (see the Department of Engineering Management in the Graduate Programs Bulletin).

Master of Science in the field of engineering management—Required: EMgt 261, 297, and 388, plus five electives of which three must be engineering management courses approved by the student's advisor. See the School of Engineering and Applied Science in the Graduate Programs Bulletin.

Five-Year Bachelor of Science with a major in economics and Master of Science in the field of operations research—Interested students should contact the Economics Department's undergraduate program advisor early in their studies to discuss the requirements of the combined degree program. Application to the graduate portion of the program is ordinarily made to the School of Engineering and Applied Science after the fifth semester, and students must be accepted for the graduate portion of the combined degree prior to the start of the seventh semester in the program.

Bachelor of Science with a major in economics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.

2. Prerequisite courses—Econ 11–12 (for students in this combined degree program, Econ 11–12 fulfill the social science requirement of the general requirements).

3. Required courses in related areas—Math 31, 32, and 33; Stat 111, 112, 129, and 157.

4. Required courses in the major—Econ 101, 102, 121, 123, 160, 198, and three additional 100-level economics courses.

5. Required courses in operations research (see the Department of Operations Research in this bulletin and in the Graduate Programs Bulletin)—OR 101, 102, 109, 216 for students pursuing a field in operations research; OR 101, 102, 135, and 236 for students pursuing a field in operations research with a concentration in management science.

Master of Science in the field of operations research—Required for a field in operations research: OR 291 and seven graduate electives chosen in consultation with the advisor.

Required for a field in operations research with a concentration in management science: OR 291, EMgt 282 or 283, EMgt 287 or Mgt 224 or Mgt 226, and five other courses selected in consultation with the advisor. See the School of Engineering and Applied Science in the Graduate Programs Bulletin.

Special Honors—Students may apply for graduation with Special Honors. To be eligible, a student must meet the requirements for Special Honors stated under University Regulations, must have a grade-point average of at least 3.5 in economics courses, and must submit an honors paper to the department. Upon review of the honors paper, the student may be recommended for graduation with Special Honors.

Minor in economics—(a) 18 credit hours in economics, including Econ 11–12, 101, 102, 121, and one other approved 100-level course in economics; (b) 6 credit hours of an approved statistics sequence, such as Stat 111–12, or 6 hours of an approved mathematics sequence, such as Math 31–32; or one approved statistics course, such as Stat 111, and one approved mathematics course, such as Math 31. Grades of C– or better are required in Econ 101 and 102.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: Econ 11–12 is prerequisite to all other courses offered by the Department of Economics.

11–12 Principles of Economics (3–3) Bradley, Dunn, Feasel, Goldfarb, Trost, Yezer

Major economic principles, institutions, and problems in contemporary life. Econ 11: Microeconomics—supply and demand, the price system and how it works, competitive and monopolistic markets. Econ 12: Macroeconomics—national income concepts, unemployment and inflation, institutions of monetary control. Econ 11 is prerequisite to Econ 12. (Econ 11 and 12—fall and spring)

101 **Intermediate Microeconomic Theory** (3) Fon, Goldfarb, Joshi, Malik, Phillips, Snyder, Vonortas

Analysis of household economic behavior, including derivation of demand functions. Analysis of firm behavior, including derivation of supply frameworks. Demand and supply interaction under various market structures and in factor markets. (Fall and spring)

102 **Intermediate Macroeconomic Theory** (3) Bradley, Feasel, Joutz

Investigation of the determinants of national income, inflation, unemployment, and interest rates. Alternative business cycle theories, with emphasis on the role of imperfect information, uncertainty, and expectations. (Fall and spring)

104 **History of Economic Thought** (3) Staff

History of the major schools of economic thought, influence of changing problems on the development of economic theory. Prerequisite: Econ 101, 102.

105 **Economic Conditions Analysis and Forecasting** (3) Staff

Theory and empirical analyses of economic trends and fluctuations; use of economic indicators and simple econometric models. (Fall)

121 **Money and Banking** (3) Aschheim, Feasel, Joutz

The role of money, credit, interest rates, foreign exchange rates, and commercial banks and other financial institutions in the U.S. economy. (Fall and spring)

122 **Monetary Theory and Policy** (3) E. Solomon

Analysis of classic and modern monetary theories and their application to current economic conditions. The links between theory and policy. The altered role of money over time; the new money technology. (Spring)

123 **Introduction to Econometrics** (3) Trost, Phillips

Joint offering of the Economics and Statistics Departments. Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Prerequisite: Math 31; Stat 112. (Fall and spring)

133 **Economies of the Former Soviet Union and Eastern Europe** (3) Pelzman, Hardt

Analysis of current economic problems in the former Soviet Union and Eastern Europe. Topics include economic models of planned economies and comparative analysis of economic development programs of the former Soviet Union, Eastern Europe, and selected developing economies. (Fall)

136 **Natural Resources and Environmental Economics** (3) Malik
Analysis of market mechanisms that allocate energy and natural and environmental resources; investigation of actual and optimal resource allocation across uses and time; review of arguments for public intervention. (Spring)

141 **Women and Work in the United States** (3) Staff
Same as WStu 260.

142 **Labor Economics** (3) Staff
Analysis of labor supply and demand; measurement and theory of unemployment; occupational choice; wage differentials; labor market issues and policies. (Fall)

148 **Health Economics** (3) Baily
Economic analysis of the determinants of demand, supply, output, and distribution in the health care sector, with special emphasis on current policy issues of access, quality, and cost. (Spring)

151 **Economic Development** (3) Jain, Smith
Theories and empirical studies of the economic problems of developing countries. (Fall and spring)

153 **Income Distribution** (3) Staff
An analysis of the distribution of income, with focus on issues relating to wealth and poverty. (Spring)

157 **Urban and Regional Economics** (3) Yezer
Analysis of the determinants of urban growth and development; firm location, the functioning of urban land and housing markets.

158 **Industrial Organization** (3) Kwoka, Snyder
Analysis of market structure, conduct, and performance of firms in a market economy, with emphasis on case studies of U.S. industries. (Fall)

159 **Government Regulation of the Economy** (3) Kwoka
Economic analysis of antitrust and regulation in the American economy. Prerequisite: Econ 158. (Spring)

160 **Introduction to Engineering Economic Analysis** (3)
Same as EMgt 160.

161 **Public Finance I** (3) Cordes, Watson
Economic analysis of government spending and social regulation programs. Topics include public goods, externalities, income transfer and social insurance programs, and benefit–cost analysis of government programs. (Fall)

162 **Public Finance II** (3) Cordes, Watson
Economic analysis of taxes and government deficits. Topics include individual and corporate income taxes, payroll taxes, sales and excise taxes, property and wealth taxes, design of tax systems, and effects of taxation on labor and capital markets. (Spring)

165 **Economics of Human Resources** (3) Boulier
Economic analysis of education and training, labor market discrimination, marriage and the family, and social security. (Fall)

169 **Introduction to the Economy of China** (3) Staff
Background, organization, and operation of the economy. Appraisal of performance and analysis of problems of development. (Fall)

170 **Introduction to the Economy of Japan** (3) Staff
Analysis of the structure and growth of the Japanese economy. (Spring)

181–82 **International Economics** (3–3) Dunn, Reeves, Moore, Suranovic
Econ 181: International trade theory and policy. Econ 182: International macroeconomic theory and policy. (Academic year)

185 **Economic History and Problems of Latin America** (3) Staff
Analysis of present structures and problems of Latin American economies.

195 **Special Topics** (3) Staff
Topics vary, depending on current issues of interest and faculty availability.

198 **Proseminar** (3) Boulier, Bradley, Cordes, Fon, Goldfarb, Suranovic, Watson
Preparation and presentation of a research paper in any field of economics agreed upon by student and instructor. Review of selected topics in contemporary economics. Open only to economics majors in their senior year.

199 **Independent Research** (3) Staff
Prerequisite: Completion of 12 hours of 100-level economics courses, including Econ 101 and 102, with a minimum grade-point average of 3.4; and approval

of an independent research project by a faculty member of the Economics Department.

EDUCATIONAL LEADERSHIP

Programs in educational leadership are offered at the graduate level by the Graduate School of Education and Human Development. The following courses are open to undergraduates.

104 Psychology for Learning and Teaching (3) Staff
Principles, theory, nature, and course of learning and teaching processes. Examination and analysis of the strategies and dynamics of teaching and learning in behavioral settings. Thirty hours of fieldwork in an educational setting (Fall and spring)

125 Museums as Cultural and Educational Resources (3) Staff
A general introduction to museums as institutions, sources of information, and places for enjoyment. Classes will take place on campus and at art, history, and science museums in the metropolitan area. (Spring)

180 Computer Literacy (3) Lynch
Word-processing, desktop publishing, graphics, database management, spreadsheets, charting, and communications software are introduced through reading, demonstrations, and hands-on activities in a computer classroom. Use of the Internet and the World Wide Web. No previous computer experience required. (Fall, spring, and summer)

ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Professors W.K. Kahn, R.L. Pickholtz, A.C. Meltzer, W.D. Maurer, H.J. Helgert, R.H. Lang, N. Kyriakopoulos, T.N. Lee, E. Della Torre, R.J. Harrington, L.J. Hoffman, W. Wasylkiwskyj, N.A. Alexandridis, S.Y. Berkovich, M.B. Feldman, M.H. Loew, R.L. Carroll, Jr., M.E. Zaghloul (*Chair*), M. Pardavi-Horvath, B.I. Edelson (*Research*), P.S. Bock, J.L. Sibert, R.S. Heller, L. Bennett (*Research*)
Adjunct Professors P.J. Crepeau, G.J. Kowalski, D.C. Roberts, A. Schneider, W.D. Jackson, J.R. Silverman, G.R. Heidbreder, O.S. Mazzoni, R.K. Lay
Professorial Lecturers A.A. Wolf, L.M. Leibowitz, P.M. Kelly, M. Mohajeri, J.H. Scharen-Guivel, J. Donelson III, J.W. Benoit, A.F. Manfredi, Jr., A.K. Mehrotra, R.M. Finn, D.L. Nicholson, W.L. Pritchard, J.M. Schumpert, D.R. Smith, D.M. Le Vine, J.B. Williamson, R.M. Zeskind, C. Alexander
Associate Professors S. Rotenstreich, C.D. Martin, D. Saha, H.-A. Choi, K.B. Eom, B. Narahari, A. Youssef, J.K. Hahn, B.R. Vojcic, C.E. Korman
Associate Professorial Lecturers E.H. Neal, C.E. Knadler, Jr., E.A. Walker, J.F. Kuehls, M.C. Frame, P.E. Gardner, S.H. Kaisler, J.J. Knab
Assistant Professors M. Doroslovacki, Z. Guo, S. Subramanian
Assistant Professorial Lecturers J.W. Sargent, J.W. Lee, J.S. Matharu, H.U. Tran, J. Thi, R.A. Fernandez, L. Liu, F.M. Nelson

See the School of Engineering and Applied Science for programs of study leading to the Bachelor of Science (Electrical Engineering), Bachelor of Science (Computer Science), and Bachelor of Science (Computer Engineering).

ELECTRICAL ENGINEERING

11 Circuit Theory (3) Zaghloul and Staff
Circuit elements, techniques of circuit analysis; circuit theorems; operational amplifiers, RLC circuits, natural and step responses; series, parallel and resonant circuits; sinusoidal steady-state analysis; phasers; power calculations; transformers; two-port circuits. CAD tools used in circuit projects. Corequisite: Phys 42, ApSc 113. (Fall and spring)

12 Circuits, Signals, and Systems (3) Kyriakopoulos and Staff
Dynamic state equations; circuit analysis using Laplace transforms, transfer functions; poles and zeroes; Bode diagrams; effects of feedback on circuits, convolution; Fourier series, integral and transforms; design of filters. CAD tools used in design of projects. Prerequisite: EE 11; corequisite: ApSc 114 (Fall and spring)

20 **Engineering Electronics** (3) Korman and Staff
Solid-state devices used in electronic engineering. Physics of their operation. Application to electronic circuits. Primary emphasis on application of these elements in power supplies and in linear amplifiers. Design concepts through use of SPICE and graphical techniques. Prerequisite: EE 11. (Fall and spring)

30 **Introduction to Electromagnetics** (3) Lang and Staff
Maxwell's equations, pulse propagation in one dimension, transmission line equations, reflection coefficient, capacitance and inductance calculations, Smith chart, plane waves, reflection from a dielectric of fiber and integrated optics. Prerequisite: ApSc 114, Phys 42. (Fall)

31 **Fields and Waves I** (3) Kahn and Staff
Review of vector calculus, orthogonal coordinates. Coulomb and Gauss laws, solid angle, scalar potential, dipoles, method of images, dielectrics, capacitance, Laplace and Poisson equations, boundary–value problems, numerical solutions with applications. Prerequisite: ApSc 113, 130; Phys 42. (Fall)

32 **Fields and Waves II** (3) Kahn and Staff
Currents, introduction to electrical transmission lines, impedance matching, Smith chart, Biot–Savart law, Ampere law, vector potential, magnets, magnetic circuits for power transformers, Maxwell equations, plane waves, Poynting vector with applications. Prerequisite: ApSc 114, EE 31. (Spring)

63 **Networks and Instrumentation Laboratory** (1) Zaghloul
Use of electronic instruments for the measurement of electrical and electronic components and networks. Verification of network laws and theorems. Characteristics and limitations of instruments. Measurements of steady-state and transient phenomena. Corequisite: EE 11. (Fall)

65 **Electronics Laboratory** (1) Korman
Testing and measurements of the characteristics of solid-state devices used in electronic systems. Characteristics of diodes, BJT, FET, SCR, operational amplifiers, and timer circuits. Design and testing of transistor amplifiers and power supplies. Prerequisite: EE 63; corequisite: EE 12, 20. (Spring)

66 **Digital Electronics Design Laboratory** (1) Korman and Staff
Characteristics of electronic devices used in switching, sweeping, and waveforming circuits. Generation of waveforms. Digital storage devices and sequential circuits. Characteristics of different methods to produce binary logic gates. Characteristics of integrated circuits. Prerequisite: EE 65; prerequisite or corequisite: EE 122. (Fall and spring)

67 **Switching Circuits Laboratory** (1) Friedman and Staff
Analysis and design of combinational and sequential switching circuits. Design and test of encoders, decoders, multiplexers, and arithmetic units. Design of combinational circuits using a PLA, counters using a PLD, and random access memory systems. Prerequisite: EE 65; prerequisite or corequisite: CSci 140, EE 122. (Fall and spring)

114 **Analog Signals and Systems** (3) Lee and Staff
Applications of matrix theory and linear graphs to electrical network analysis; network equations; state–space formulation and solution. Fourier transforms and spectra in electrical systems. Network functions; analysis and synthesis of analog filters; the approximation problem; realization of filters. Prerequisite: EE 12, 20. (Fall)

117 **Digital Signals and Systems** (3) Kyriakopoulos and Staff
Signal representation, sampling and quantization, discrete-time signals, z-transforms and spectra, difference equations. Discrete Fourier transform, fast Fourier transfer, IIR and FIR filter design. May be taken for graduate credit. Prerequisite: EE 12. (Spring)

121 **Engineering Electronics Design** (3) Korman and Staff
Design and analysis of differential and multistage amplifiers. Low-frequency and high-frequency response of amplifiers; high-frequency models of FETs and BJTs. Introduction to feedback; feedback topologies, loop gain. Output stages and power amplifiers. Use of P-Spice in design. Prerequisite: EE 12, 20. (Spring)

122 **Digital Electronics and Design** (3) Korman and Staff
Introduction to the design of large signal circuits used in computers and communications systems. Design of logic gates and flip-flops. Concepts in integrated circuit design. Design of counting and timing circuits using ICs. Pulse, sweep, and wave-shaping circuits. Prerequisite: EE 20. (Fall)

124 **Nonlinear Electronic Devices** (3) Korman and Staff
Electronic devices designed from nonlinear or quantum mechanical principles. Surface acoustic wave devices and filters. Varactors as converters, and parametric amplifiers. MOS capacitors and CCD devices; Klystrons, TWTs and gyrotrons. MASERS, LASERS, and FELs; negative conductance; transferred electron mechanism in GaAs; Gunn oscillators. Prerequisite: EE 32, 121 (Spring)

126 **VLSI Design and Simulation** (3) Zaghloul and Staff
Design of VLSI circuits. Stick diagramming, NMOS transistors, switch and gate logic, PLAs, finite-state machines, design rules, CAD system, speed and power considerations, floor planning, layout techniques. The student will design a VLSI circuit and simulate the design. May be taken for graduate credit. Prerequisite: CSci 140, 162, 165; EE 122. (Fall)

127 **VLSI Fabrication Techniques** (3) Zaghloul and Staff
Choice of circuit technologies, process technologies associated with various types of components. Fabrication of VLSI, two basic MOS technologies and other available technologies, oxidation, photoengraving, chemical etching, diffusion. May be taken for graduate credit. Prerequisite: CSci 140; EE 122. (Spring)

128 **Testing of VLSI Circuits** (3) Zaghloul and Staff
Continuation of EE 126, principally for the testing of VLSI circuits that have been designed and fabricated. Topics include testing techniques and use of the VLSI system-testing laboratory. Design for testability techniques and design of a testable system. Students must test the circuits previously designed. May be taken for graduate credit. Prerequisite: EE 126. (Spring)

134 **Optical Systems** (3) Kahn and Staff
Introduction to the design of optical systems. Review of geometric optics, rays, and waves. Types of optical fibers, index and gradient index. Structure of beam waveguides. Gaussian beams. Design of lasers. Coherence and polarization, holographic systems. Fourier transforms and optical filtering. Coupled modes. Design of optical components. Prerequisite: ApSc 114; EE 32. (Spring)

143 **Communications Engineering I** (3) Doroslovacki and Staff
Fourier series and Fourier transform in relation to signal analysis. Convolution and linear filtering. Signal bandwidth and sampling theorem. Analog modulation. Random variables and stochastic processes; power spectrum. Digital modulation: BPSK, QPSK, MSK. Pulse code modulation, DPCM and delta modulation. Prerequisite: ApSc 115; EE 12, 122. (Fall)

144 **Communications Engineering II** (3) Doroslovacki and Staff
Fundamental limits of communication theory. Digital communication schemes. Approaches to multiplexing. Packet and circuit switching. Telephone channel and modem design. Layered reference models for data networks. Data link protocols, error control, Automatic Repeat Request. Multiple access in local area networks. Cellular and optical networks. Prerequisite: EE 143. (Spring)

146 **Communications Laboratory** (1) Doroslovacki and Staff
Experiments supporting communications systems. Fourier analysis and Fourier transform. Sampling theorem, filtering, and aliasing. Amplitude modulation (AM), frequency modulation (FM), quantization, and pulse code modulation (PCM). Delta modulation. Binary phase shift keying (BPSK). Quadrature phase shift keying (PSK). Prerequisite: EE 67; corequisite: EE 143. (Fall)

147 **Data Communications Laboratory** (1) Doroslovacki and Staff
Experiments in support of the analysis and design of communications systems with emphasis on network protocols. Time and frequency division multiplexing, flow control, automatic repeat request, interfacing, token ring, token bus, multiple access for Ethernet, routing, packet switching. Prerequisite or corequisite: EE 144, 146. (Spring)

148 **Simulation of Communications Systems** (3) Vojcic
Representation and simulation of deterministic and random signals and systems. Modeling of communication systems; performance measures and statistical methods for the interpretation of simulation results. Simulation techniques and technology in communications. Case studies. Corequisite: EE 144 or equivalent. May be taken for graduate credit. (Spring)

160 **Modern Measurements and Sensors** (3) Pardavi-Horvath and Staff
Measurement of dc, ac, and high-frequency signals. Interfacing with a microcomputer. Interface electronic circuits. Sensors for measurement of mechanical,

optical, magnetic, electromagnetic, thermal, chemical, and biochemical signals. Prerequisite: EE 32, 121; CSci 140. (Spring)

163 **Senior Electrical Engineering Design Project Laboratory I** (3) Meltzer and Staff
Conception, planning, design, and construction of a one-year project. Economic analysis of the product. Use of Gantt charts. Lectures on presentation techniques, safety, grounding, project construction, and professionalism. Five project report presentations, using visual aids. Formal written reports. Prerequisite: EE 169, 172, and senior status; corequisite: EE 143. (Fall)

164 **Senior Electrical Engineering Design Project Laboratory II** (3) Meltzer and Staff
Completion and demonstration of project started in EE 163. Formal written reports, demonstrations, and oral presentations, using visual aids, of the progress of the project throughout the semester. Lectures on presentation techniques, project plans, packaging, board layout, testing procedures, user's manual, and user interfaces. Prerequisite: EE 163. (Spring)

166 **Electrical Power Laboratory I** (1) Harrington and Staff
Experiments in support of the analysis and design of electrical power systems. Measurements of the characteristics of devices to generate electric power. Rectification and inversion processes for power systems and drives. Prerequisite or corequisite: EE 67, 177. (Fall)

167 **Electrical Power Laboratory II** (1) Harrington and Staff
Speed and torque control of AC and DC motors. Use of computers in the laboratory to perform such control. Applications of computer control to frequency and voltage control in power systems. Prerequisite: EE 166. (Spring)

168 **Microwave and Optics Laboratory** (1) Lang
Experiments in transmission lines, network analyzer measurements of scattering parameters, microwave systems, fiber-optic systems and antennas. Introduction to the characteristics of laser and optical systems. Prerequisite: EE 67; corequisite: EE 133 or 134. (Spring)

169 **Advanced Electronics Design Laboratory** (1) Korman and Staff
Experiments in the analog operation of electronic devices. Introduction to PCB technology. Experiments in power supplies, differential and multistage amplifiers; oscillators, power amplifiers, operation amplifiers, tuned amplifiers and filters. Use of P-Spice in design. Prerequisite: EE 66 and 67; corequisite: EE 121. (Spring)

172 **Control Systems Design** (3) Carroll and Staff
Mathematical models of linear systems; steady-state and transient analyses; root locus and frequency response methods; synthesis of linear feedback control systems. Prerequisite: ApSc 114, EE 12 or ME 134. (Fall)

176 **Control Systems Laboratory** (1) Carroll and Staff
Experiments in support of control theory, involving the use of the digital computer for process control in real time. Design of feedback and compensation with computer implementation. Digital simulation of linear and nonlinear systems. Prerequisite or corequisite: EE 67, 172 or equivalent. (Fall)

177 **Electrical Energy Conversion** (3) Harrington and Staff
Fundamentals of electromechanical energy conversion. Three-phase and single-phase AC rotating machines and transformers, DC machines, rotating machines as circuit elements. Prerequisite: EE 12, 31. (Fall and spring)

178 **Electrical Power Systems** (3) Harrington and Staff
Introduction to electrical power systems; transmission and distribution of electrical power, three-phase circuits, symmetrical components, fault analysis. Voltage, current, and power limitations. Analysis of lightning and switching surges in power systems. Protective devices—switchgear, arresters, and isolators. May be taken for graduate credit. Prerequisite: EE 177. (Fall)

184 **Introduction to Medical Engineering** (3) Loew and Staff
Terminology of the medical profession; physiology of the human body, from overall systems or functional approach; survey of present-day medical measurements and consideration of those areas in which engineering may be applied advantageously to medicine. May be taken for graduate credit by students in fields other than medical engineering. (Spring)

186 **Medical Engineering Laboratory** (1) Loew and Staff
Experiments in support of instrumentation used in medicine and biology; safety considerations. Acquisition and measurement of physiological signals, EKG,

EEG, evoked potentials. Processing of signals derived from physiological measurements. Concepts in telemetry of medical signals. Prerequisite or corequisite: EE 32, 66, 121, 184. (Spring)

192 **Robotic Systems** (3) Carroll and Staff
Modeling and analysis of robot designs. Kinematics of mechanical linkages, structures, actuators, transmissions, and sensors. Design of robot control systems, computer programming, and vision systems. Use of artificial intelligence. Current industrial applications and limitations of robotic systems. Same as ME 197. Prerequisite: computer programming, ApSc 58, EE 172. (Spring)

196 **Robotics Laboratory** (1) Carroll and Staff
Experiments illustrating basic principles and programming of robots and other automated machinery. Design and writing of computer programs to use a robot's arm, vision, and data files to accomplish tasks. Prerequisite or corequisite: EE 192/ME 197. (Spring)

197 **Special Topics** (1 to 3) Staff
Topic to be announced in the *Schedule of Classes*. (Fall and spring)

198 **Research** (1 to 3) Staff
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

COMPUTER SCIENCE

10 **Applications Software** (3) Heller and Staff
Introduction to the use of microcomputer hardware and software for word processing (e.g., WordPerfect), spreadsheets (e.g., Quattro), and database management (e.g., dBase III), with emphasis on the use of computers to solve typical problems in academia and business. May not be counted toward degree requirements by majors in the department. (Fall and spring)

30 **Computer Literacy** (3) Martin and Staff
Survey of computers and languages, introduction to computer programming, history of computing, the effect of computers on our lives, uses for computers. May not be counted toward degree requirements by majors in the department. Prerequisite: high school algebra. (Fall and spring)

49 **Computing for Engineers and Scientists** (3) Choi and Staff
Structured programming with the C language. Control structures. Data types. Use of pointers. Matrix manipulation to solve simultaneous equations. External subroutines for mathematical and graphical applications. Introduction to C++. Complex number representation. Corequisite: Math 31. (Fall and spring)

50 **Computing for Engineers** (3) Harrington and Staff
Structured programming with high-level language using FORTRAN. Control structures. Different data types with emphasis on real and complex number computations. Arrays used with vector and matrix manipulation to solve simultaneous equations. External subroutines for mathematical and graphical applications. Prerequisite or corequisite: Math 31. (Fall and spring)

51 **Introduction to Computing** (3) Feldman and Staff
Introduction to the solution of problems on a digital computer using Ada. Structured programming concepts; peer review and proper documentation techniques; efficiency of programs; design of test data. Writing, debugging, and running programs in an interactive computing environment. Prerequisite or corequisite: Math 31. (Fall and spring)

60 **C as a Second Language** (1) Choi and Staff
Introduction to the C programming language and the Unix operating system. Structure of the programs. Input/output, control, pointers, arrays, dynamic memory allocation, and file handling. Concepts in abstract data types. Prerequisite: CSci 131 or equivalent. (Fall and spring)

100 **Introduction to Programming** (3) Martin and Staff
Intensive introductory course for students with a science, mathematics, or other quantitative background. Solution of numerical and nonnumerical problems on a digital computer using C programming language in a Unix environment. Recommended for graduate and advanced undergraduate students in other departments. Prerequisite: Math 32 or equivalent. (Fall and spring)

110 Technology and Society (3) Martin and Staff
The social impact of the information age. Privacy, piracy, automation, reliability of socially critical systems, role of simulations in decision making and computer crime. Professional software tools such as word processing, graphics packages, databases, and spreadsheets. Professional ethics. Technical writing and oral communication skills. Prerequisite: CSci 49, 50, or 51. (Spring)

120 Assembly Language Programming (3) Maurer and Staff
Machine and assembly language. Instructions, directives, addressing modes, status flags, subprograms, stack operations, shifting, masking, character strings, pointers, multiple precision, floating point. May be taken for graduate credit except by majors in computer science. Prerequisite: CSci 49, 50, or 51 or equivalent. (Fall and spring)

131 Data Structures (3) Feldman and Staff
Data structures used in computer programming and algorithms. Use of tree structures, arrays, lists, stacks, files, strings, and linked structures. Sorting, searching, hashing, and merging of data. Performance of algorithms using different data structures. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 51. (Fall and spring)

133 Discrete Structures (3) Narahari and Staff
Mathematics for computer science. Sets, functions, and sequences. Propositional and predicate calculus, formal proofs, mathematical induction. Matrices, semigroups, groups, and isomorphism. Relations, partitions, equivalence relations, trees, graphs. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 51, Math 32. (Fall and spring)

134 Discrete Analysis in Computer Science (3) Berkovich and Staff
Combinatorial theory: permutations and combinations, generating functions, recurrence relations, the principle of inclusion and exclusion. Polya' theory of counting. Block designs. Applications to the analysis of algorithms, computer organization, VLSI placement, coding theory, simulation, and other problems. May be taken for graduate credit. Prerequisite: CSci 133 or permission of instructor. (Fall)

140 Design of Switching Systems I (3) Friedman and Staff
Switching logic, combinational and sequential circuits. Number systems and codes, binary arithmetic, Boolean algebra. Minimization techniques. Combinational circuits, programmable logic, synchronous sequential circuits. May be taken for graduate credit except by majors in computer science. (Fall and spring)

142 Foundations of Computing (3) Choi and Staff
Ordering, formal grammars, finite-state machines, equivalence of machines, reduction, finite-state languages, acceptors, regular expressions, pushdown automata, context-free languages, Turing machines, computability. Prerequisite: CSci 133; corequisite: CSci 144. (Spring)

144 Programming Language Concepts (3) Heller and Staff
Concepts and comparisons of data types, syntax, semantics, recursion, binding times, sequence and data control, run-time resources, translators, and storage of program languages. Team programming. May be taken for graduate credit except by students in computer science. Prerequisite: CSci 131. (Fall and spring)

145 Software Laboratory I (1) Choi
Computer-programming projects designed to supplement the theory and programs of CSci 144 and 148. Students write structured programs and use proper documentation. Prerequisite: CSci 60, 144; corequisite: CSci 148. (Fall)

146 Software Laboratory II (1) Rotenstreich and Staff
Computer-programming projects designed to supplement the theory and programs of CSci 156. Team projects to design new I/O drives and similar projects involving operating system modules. Structured programming and proper documentation techniques. Prerequisite: CSci 60; corequisite: CSci 156. (Spring)

148 Theory of Computer Translators (3) Choi and Staff
Lexical and syntax analysis, regular expressions, context-free grammars, parsing techniques, top-down parsing, efficient parsing, syntax-directed translation, intermediate formats, flow of control, block structures, procedure calls, symbol tables, run-time storage, error-detection and recovery, code optimization, code generation. Prerequisite: CSci 60, 142, 144. (Fall)

152 **File Structures** (3) Feldman
Data structures for large files. Storage management, block retrieval, fragmentation problems. Sequential, indexed, and hierarchical access methods: trees and tries; logical and physical file access; external sorting, searching, and merging. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 60, 131. (Fall)

155 **Introduction to Numerical Methods** (3) Della Torre and Staff
Numerical methods for solving simultaneous linear equations, roots of equations, eigenvalues and eigenvectors, numerical differentiation and integration, interpolation, solution of ordinary and partial differential equations, and curve fitting. May be taken for graduate credit. Prerequisite: ApSc 113, 115; CSci 51 or equivalent. (Fall)

156 **Introduction to Operating Systems** (3) Rotenstreich and Staff
Process management, process state, concurrent processing, synchronization, events. Operating system structure, the kernel approach, processor scheduling, task switching, monitors. System management, memory management, process loading, communication with peripherals. File systems. Interactive computation. Prerequisite: CSci 60, 144. (Spring)

157 **Advanced Assembly Language** (3) Maurer and Staff
Introduction to reduced instruction set computing (RISC) machine and assembly language. Macros and conditional assembly. Coprocessor instructions. Use of an operating system. May be taken for graduate credit except by majors in computer science. Prerequisite: CSci 120 or equivalent. (Fall)

162 **Design of Switching Systems II** (3) Zaghloul and Staff
Analysis of symmetric, unate, and threshold functions: Boolean difference and decomposition. Timing in sequential circuits, essential hazards, races in sequential circuits. Design for testability. Designing using PLDs. Introduction to ASIC design techniques. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 140 and EE 122. (Spring)

163 **Senior Computer Science Design Project Laboratory I** (3) Meltzer and Staff
Conception, planning, design and construction of a one-year project. Economic analysis of the product. Use of Gantt charts. Lectures on presentation techniques, safety, grounding, project construction and professionalism. Five project report presentations, using visual aids. Formal written reports. Start of the construction. Prerequisite: CSci 156, 172; and senior status. (Fall)

164 **Senior Computer Science Design Project Laboratory II** (3) Meltzer and Staff
Completion and demonstration of project started in CSci 163. Formal written reports, demonstrations, and oral presentations, using visual aids, of the progress of the project throughout the semester. Lectures on presentation techniques, project plans, packaging, board layout, testing procedures, user's manual, and user interfaces. Prerequisite: CSci 163. (Spring)

165 **Sequential Circuit Laboratory** (1) Zaghloul and Staff
Threshold circuits and asynchronous sequential circuits. Testing for faults in logic networks. Circuits using program logic devices. Use of design automation programs in designing sequential machines. Prerequisite or corequisite: CSci 140, 162; EE 66, 67, and 122. (Spring)

166 **Computer Engineering Laboratory I** (1) Meltzer and Staff
Experiments in support of the theory and design of microprocessor and microcomputer hardware and software. Use of microprocessors in control of systems. Use of simulators, cross-compilers, and development systems. Prerequisite or corequisite: CSci 165, 172. (Fall)

167 **Computer Engineering Laboratory II** (1) Meltzer and Staff
Class project, using a team approach in designing the subsystems needed to produce a complete digital computer system. Includes experience in software development, techniques for buses and local area networks, and design of I/O and memory subsystems. Prerequisite or corequisite: CSci 166, 188. (Spring)

168 **Simulation Methods** (3) Bock and Staff
Computational methods for continuous and discrete system simulation. Effects of computer software and hardware architectures on computational precision and accuracy requirements. Random-number generation and testing. Calibration and scaling technique. Verification and validation technique. Prerequisite: CSci 144, 155. (Spring)

172 **Computer Organization** (3) Meltzer and Staff
Structure and operation of a digital computer. Evaluating computer performance. Binary arithmetic. Design of computer arithmetic units, data, and instruction paths. Microprogramming; memory technology; virtual memory; caches; pipelined computer organization; characteristics of secondary storage; I/O interfacing. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 120, 140. (Spring)

174 **Artificial Intelligence** (3) Bock and Staff
Abstraction of process and data with list structures. Functional programming. Changes in the state of objects and processes. Environments. Streams. Messages. LISP and PROLOG interpreter models using EVAL and APPLY. Symbolic logic and formal inference; unification and resolution. May be taken for graduate credit. Prerequisite: CSci 144. (Spring)

175 **Software Engineering** (3) Rotenstreich and Staff
Macroassemblers, library management, linkers and loaders. Control of I/O via access methods. Requirements definition, modularity, structured design, data and functional specifications, verification, documentation. Program design. Software tools, maintenance, project organization, design teams, quality assurance. Prerequisite or corequisite: CSci 152. (Spring)

178 **Database Management** (3) Narahari and Staff
Design and architecture of database systems. Query formulation, data models, data structures to minimize access time, relational data structures. Construction of a database management system. Survey of existing systems. May be taken for graduate credit. Prerequisite: CSci 152. (Fall)

182 **Computer Systems Architecture** (3) Alexandridis and Staff
Design of bus-based digital computer systems, memory subsystems, caches, and multiple processors. Comparison of RISC and CISC processors and standard buses. Bus transfer and control signals. Performance, memory management, architectural support for protection, task switching, exception handling, instruction pipelines. May be taken for graduate credit. Prerequisite: CSci 172. (Fall and spring)

185 **Computer Graphics I** (3) Sibert and Staff
Hardware; concepts of graphics subroutine packages; programming concepts for interaction, display, and data structuring; basic clipping and scan-conversion algorithms; homogeneous coordinates; three-dimensional viewing transforms. May be taken for graduate credit. Prerequisite: CSci 144. (Fall)

187 **Design of User–Interface Programs** (3) Sibert and Staff
How to write programs, like those sold in stores, which call several hundred system procedures to work with the mouse, windows, menus, dialogs, icons, etc. May be taken for graduate credit. Prerequisite: CSci 144. (Spring)

188 **Distributed Computing Systems** (3) Meltzer and Staff
Connection of computers into a distributed system using networks. Network standard protocols, electrical interfaces, modems, multiplexers, concentrators, network switches, packet switching, data transmission techniques, error control, LAN and WAN, Internet working, multiserver networks, high-level protocols, distributed databases. Prerequisite: CSci 156, 182. (Spring)

190 **Real-Time Computer Systems** (3) Feldman
Development of software for real-time control of physical systems. Reliability and fault tolerance, exceptions and exception handling, reliability and concurrent processes, timeouts, deadline scheduling, shared-memory and message-based device drivers. May be taken for graduate credit. Prerequisite: CSci 150, 175. (Spring)

197 **Special Topics** (1 to 3) Staff
Topic to be announced in the *Schedule of Classes*. (Fall and spring)

198 **Research** (1 to 3) Staff
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

ELECTRONIC MEDIA

See **Media and Public Affairs**.

EMERGENCY MEDICAL SERVICES

Information on the Bachelor of Science in Health Sciences in the field of emergency medical services is available from the School of Medicine and Health Sciences.

ENGINEERING MANAGEMENT

Programs in engineering management are offered at the graduate level by the School of Engineering and Applied Science. The courses listed here are open to undergraduates.

160 **Introduction to Engineering Economic Analysis** (3) Duffey and Staff
Economic decisions, equivalence, mathematics of finance, present worth, annual worth, benefit–cost ratio, internal rate of return, multiple alternatives, tax effects, inflation, risk loans, retirement and replacement, sensitivity analysis.
(Fall and spring)

170 **Basic Quantitative Methods for Engineering Management** (3) Donnell and Staff
Quantitative methods appropriate to engineering management, using advanced concepts from probability and statistics. Random variables and probability distributions, estimation, test of hypotheses, linear regression and correlation, introduction to the design of experiments, analysis of variance. Prerequisite: Math 52 or equivalent. (Fall, spring, and summer)

ENGINEERING SCIENCE

See **Civil, Mechanical, and Environmental Engineering.**

ENGLISH

Professors R.N. Ganz, Jr., J.H. Maddox, G. Paster, J.A.A. Plotz, J.A. Quitslund, C.W. Sten (*Chair*), D. McAleavey, O.A. Seavey, L.B. Salamon, R. Sunder Rajan (*Visiting*), A. Romines
Associate Professors G.R. Bozzini, R.L. Combs, G. Carter, K. Moreland, D. Moshenberg, M. Alcorn, M.S. Soltan, J. Shore, F. Moskowitz, T.G. Wallace, M.D. Clair, J.M. Green-Lewis
Associate Professorial Lecturer P. Griffith
Assistant Professors M.V. Dow, S.P. Willens, P. Chu, J.J. Cohen, P. McGann, Y. Park, G. Wald, V. Chandra, S. Wolf, E. Schreiber, J. Harris, A. Hewett, R. McRuer, R. Samuels
Adjunct Assistant Professors J. Bolz, D. Scarboro, C. Gamber, S. Maley, A. Wilkerson
Adjunct Instructors D.A. Bruno, S. Gold, P. Presser
Jenny McKean Moore Writer in Washington D. Vilmure

Bachelor of Arts with a major in English—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Engl 51–52 or 61–62 or 71–72 or 73–74 or 91–92; or Hmn 1, 2; or Honr 15–16.
3. Required courses in related areas—(a) foreign language (see option 8a under Columbian School of Arts and Sciences, General Curriculum Requirements); (b) 6 credit hours of philosophy, religion, and/or mythology; (c) 6 credit hours of history (English, American, European, or world).
4. Required for the major—33 credit hours of 100-level English courses, including the following:
   a) 9 hours in literature before 1800 (Engl 112, 113, 125, 127–28, 130, 131–32, 153, 155, 160)
   b) Engl 120 and 3 additional hours in literary theory and or cultural studies (Engl 124, 137, 175, 176, 179, 195, 196)
   c) 3 hours in minority or post-colonial literature and tradition (Engl 139–40, 169, 173, 174, 179, 187, 188)

With departmental approval, courses with appropriate subject matter may be substituted for those specified above.

Students take 15 additional hours of 100-level English courses, of which no more than 9 hours may be in creative writing or composition. Electives should include at least 3 hours each in 19th- and 20th-century literature; 6 hours of literature of a foreign language (either in the original language or in translation) may be substituted for English electives with approval of the English Department.

Special Honors—Majors who wish to be considered for Special Honors must meet the general honors requirements listed under Regulations; have maintained a 3.0 grade-point average; and apply for admission to the program, in writing, by October 15 of the junior year. Once admitted, the candidate must enroll in Engl 195 in the spring semester and in Engl 196 in the following fall semester. During the junior year, candidates must continue to maintain a 3.0 overall grade-point average and a 3.25 average in courses in the English Department. Subject to departmental approval, the candidate enrolls in Engl 198 in the spring semester of the senior year. To be eligible for graduation with Special Honors, candidates must earn an *A* on the Honors Thesis and have achieved a 3.4 grade-point average in courses in the English Department.

Bachelor of Arts with a major in dramatic literature—The Department of Theatre and Dance and the Department of English offer an interdisciplinary major in dramatic literature. See Dramatic Literature.

Minor in English—6 hours of introductory literature courses and 15 hours of 100-level literature courses, chosen in consultation with an advisor in the department.

Minor in creative writing—Engl 81, 6 hours of introductory literature (e.g., Engl 51–52), and 12 hours of 100-level courses offered by the department, of which at least 9 must be in creative writing.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: Engl 9 or 10 is prerequisite to all other courses in English. A 6-credit-hour literature survey, such as Engl 51–52, 61–62, 71–72, or any pair of courses listed under the general curriculum requirement in literature, is prerequisite for admission to all 100-level courses in the English Department except Engl 102, 110, 160, 161, 162, and 181.

Scores on the College Board SAT II Writing Subject Test or the English component of the American College Testing battery determine placement in Engl 9 or 10 and eligibility to waive the requirement, according to the following schedule.

SAT II Writing Subject Test		*ACT*	*Placement*
710 and above	**or**	28 and above	Waives Engl 10
560–709	**or**	20–27	Engl 10
559 and below	**or**	19 and below	Engl 9

The admission of international students to any English course is determined by the EFL Placement Test. Students should apply to the office of English as a Foreign Language to take this test (see Students from Foreign Institutions, under Admissions).

EXPOSITORY WRITING

9 English Composition: Language as Communication (3) Moshenberg and Staff
Includes content of Engl 10; offers the advantage of more intensive work on analytical reading and on fluency and control in the writing process. Class meets five hours per week. (Fall and spring)

10 English Composition: Language as Communication (3) Moshenberg and Staff
Critical examination of what language can do and what student writers can do with language: analysis of various kinds of discourse, focusing on their pragmatic and psychological dimensions. Emphasis on the writing process, with guidance in revising toward clear, effective, and engaging prose. (Fall and spring)

11 English Composition: Language and the Arts and Sciences (3) Moshenberg and Staff
Prepares the student to participate critically in the diverse, interpretative community of the university. Analysis of texts, with emphasis on logic, values, and context. Focuses primarily on the polemic nature of writing and thought. Texts and course topics vary among sections. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 11 cannot receive credit for Engl 13. (Fall and spring)

13 English Composition: Language and Ideas (3) Staff
Study and practice of expository and argumentative techniques; emphasis on the rhetorical problems raised by various intellectual disciplines and historica

milieus. A substantial research paper is required. Prerequisite: Engl 9 or 10. To be taken only in conjunction with Hmn 11. Students who receive credit for Engl 13 cannot receive credit for Engl 11. (Fall)

100 **Intermediate Expository Writing** (3) Staff
Concentration on perfecting the skills of addressing a variety of audiences, focusing and organizing the essay, varying tone and method of discourse, and using appropriate vocabulary in several subjects. Texts and topics vary. Prerequisite: Engl 11 or equivalent. Class size limited to 15 students.

101 **Advanced Writing** (3) Staff
Individualized instruction and frequent conferences; writing projects vary with each student according to needs and interests. Emphasis on developing professional work habits. Prerequisite: Engl 11 or 13, or written permission of instructor. Class size limited to 15 students. (Fall and spring)

102 **Written Communications in Accounting** (3) Staff
Analysis of communications by accountants and managers; frequent writing assignments, with emphasis on effective form and language in memoranda, letters, reports. Major in accountancy not required. Prerequisite: Engl 11 and junior status. Class size limited to 15 students. (Fall and spring)

110 **Writing in Engineering and the Sciences** (3) Staff
Study of writings by engineers and scientists who have considered the implications of technology in the modern world. Concurrently, study and practice of the communication skills needed for careers in engineering and the sciences. Prerequisite: Engl 9 or 10 or EFL 50; junior, senior, or graduate status (Spring)

111 **Preparation for Peer Tutors in Writing** (3) Schreiber
For undergraduates accepted as tutors in the Writing Center: study and practice of techniques for prewriting, writing, and revision; readings on collaborative learning, the composing process, composition theory, cognitive psychology, critical thinking, and the teaching of writing; observation and exercises in writing, peer review, and tutoring. (Fall)

CREATIVE WRITING

81 **Introduction to Creative Writing** (3) Moskowitz and Staff
An exploration of genres of creative writing (fiction, poetry, and/or playwriting). Basic problems and techniques; examples of modern approaches; weekly writing assignments; workshop and/or conference discussion of student writing. Prerequisite: Engl 11. Limited to 15 students. (Fall and spring)

103 **Intermediate Fiction I** (3) Moskowitz, Clair, Chandra
The writing of fiction. Prerequisite: Engl 81 or equivalent. Limited to 15 students. (Fall and spring)

104 **Intermediate Poetry I** (3) McAleavey, Clair, Bolz, Shore
The writing of poetry. Prerequisite: Engl 81 or equivalent. Limited to 15 students. (Fall)

105 **Fundamentals of Playwriting** (3) P. Griffith
Same as TrDa 105. Study of the process of playwriting, emphasizing dramatic structure, characterization, and dialogue. Requirements include study and analysis of plays, attendance at plays, scene writing, and beginning the process of developing a play. Prerequisite: Engl 81 or equivalent and a two-semester literature survey (e.g., Engl 51–52). Limited to 15 students. (Fall)

106 **Intermediate Fiction II** (3) Moskowitz, Clair, Chandra
The writing of fiction. Prerequisite: Engl 103 or equivalent. Limited to 15 students. (Spring)

107 **Intermediate Poetry II** (3) McAleavey, Bolz, Clair, Shore
The writing of poetry. Prerequisite: Engl 104 or equivalent. Limited to 15 students. (Spring)

108 **Intermediate Playwriting** (3) P. Griffith
Same as TrDa 108. Each student will develop a complete play. Attendance at local productions. Group readings of work written for the course and staging of scenes in cooperation with the Department of Theatre and Dance. Prerequisite: Engl 105 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval. (Spring)

116 **Advanced Fiction** (3) Moskowitz, Clair, Chandra
Further workshop study of the writing of fiction. Prerequisite: Engl 106 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval.

117 **Advanced Poetry** (3) McAleavey, Shore, Bolz
Further workshop study of the writing of poetry. Prerequisite: Engl 107 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval.

181 **Creative Writing Workshop** (3)
Taught by the Jenny McKean Moore Writer in Washington; open to undergraduates and graduate students. Prerequisite: a 100-level creative writing course. May be repeated for credit, if taught by a different instructor. Limited to 18 students. (Fall and spring)

ENGLISH AND AMERICAN LITERATURE

51–52 **Introduction to English Literature** (3–3) Paster, Plotz, and Staff
Representative works by major authors studied in their historical context; discussion of recurrent themes and introduction to various types and forms of imaginative literature. Engl 51: Middle Ages through the 18th century. Engl 52: 19th and 20th centuries. (Academic year)

61 **Tragedy** (3) Carter
Modes of tragedy as developed in drama, nondramatic verse, and prose fiction in literature from ancient to modern times—Book of Job to Beckett.

62 **Comedy** (3) Staff
Modes of comedy as developed in drama, nondramatic verse, and prose fiction—Chaucer to Borges.

71–72 **Introduction to American Literature** (3–3) Ganz, Combs, and Staff
Historical survey. Engl 71: From early American writing through Melville, Whitman, and Dickinson. Engl 72: From Twain, James, and Crane to the present. (Academic year)

73–74 **Literature of Black America** (3–3) Wald
Survey of the major periods and principal authors of the African American tradition. Engl 73: 1789–1900. Engl 74: 20th century. (Academic year)

91–92 **Survey of Postcolonial Literature** (3–3) Plotz, Dow, and Staff
Introduction to postcolonial literature from the perspectives of colonizer and colonized in Great Britain, India, Pakistan, Bangladesh, Sri Lanka, Australia, New Zealand, Canada, Anglophone Africa, and the Caribbean region; literature written on the wing, in diaspora. Prerequisite: Engl 10 and 11 or 13. (Academic year)

112 **Chaucer** (3) Cohen
Chaucer's major works seen as exciting, lively texts from the modern perspective and as products of specific economic, social, and cultural trends of the late 14th century. Focus on *The Canterbury Tales*, read in the original Middle English. (Fall)

113 **Medieval Literature** (3) Cohen
Readings from a wide range of medieval genres, including romances, saints' legends, mystical narratives, lyrics, civic drama, and social satires, to explore some of the principal concerns of medieval culture. How these texts responded to and shaped the changing patterns of medieval culture, as the clergy, the aristocracy, and the urban bourgeoisie attempted to define a culture of their own.

120 **Critical Methods** (3) Paster, Alcorn, Romines, Quitslund
The topics and techniques of literary analysis, applied to English and American poetry, prose fiction, and drama. Attention to prosody, stylistic and structural analysis, narratology, and critical theory applied to specific literary texts. (Fall and spring)

124 **Play Analysis** (3) Wolf
Same as TrDa 124. Examines both traditional and nontraditional (Aristotelian and non-Aristotelian) approaches to the analysis of dramatic literature and explores literary and theatrical techniques used by playwrights. (Spring, odd years)

125 **The English Renaissance** (3) Quitslund
Verse and prose, chiefly from the period 1575–1625, seen in relation to continental culture and the social institutions that shaped the development of

English culture. Sidney, Spenser, Shakespeare, Campion, Donne, Jonson, Bacon, Herbert, others; emphasis on the development of several literary styles and on adaptation of genres to suit changes in private and social experience.

127–28 **Shakespeare** (3–3) Paster
Close study of seven or eight plays each semester, with emphasis on the texts in history and ideology. Survey of current critical practices (feminist, materialist, psychoanalytic) and deconstruction of Shakespeare as a cultural institution. (Academic year)

130 **Milton** (3) Staff
Study of the major works in verse and prose, following the course of Milton's career. (Spring)

131–32 **The 18th Century: Literature and Authority** (3–3) Wallace
Readings in significant 18th-century English writers—Dryden, Swift, Pope, Johnson, and others—with emphasis on tracing the ways in which literary texts contain, perpetuate, and subvert social and political ideologies.

133–34 **The Romantic Movement** (3–3) Plotz, Combs
Major figures and topics in English and Continental romanticism. Engl 133: Blake, Wordsworth, Coleridge, Lamb, and others. Engl 134: Byron, Shelley, Keats, Hazlitt, DeQuincey, and others.

135–36 **Victorian Literature** (3–3) Carter
Engl 135: 1830–1865—E. Brontë, Dickens; Tennyson, Browning, Arnold; Darwin, Carlyle, Ruskin. Engl 136: 1865–1900—Eliot, Hardy, Conrad; Swinburne, the Rossettis, Morris; Pater, Wilde, the Nineties.

137–38 **Modernism** (3–3) Soltan, Green-Lewis
Engl 137: the emergence of modernist experimentation (and the sense of epistemological and moral crisis it expressed) in the poetry and prose of Pound, T.S. Eliot, Woolf, Kafka, and others. Engl 138: the reaction against modernist styles and themes in the wake of World War II, as seen in the work of Auden, Waugh, Wyndham Lewis, Faulkner, Barnes, Lessing.

139–40 **20th-Century Irish Literature** (3–3) Maddox
Irish writers from the time of the Literary Revival in the late 19th century to the present. Engl 139: Yeats and other Irish poets and playwrights of his time and after—Synge, O'Casey, Kavanagh, Heaney, and others. Engl 140: Joyce through *Ulysses* and other fiction writers of later generations—O'Brien, Beckett, and others. (Academic year)

153–54 **The English Novel** (3–3) Maddox, Soltan, Wallace
Engl 153: The 18th century—Defoe, Richardson, Fielding, Sterne, and others. Engl 154: The 19th century—Austen, the Brontës, Dickens, George Eliot, Hardy, and others. (Academic year)

155–56 **The English Drama** (3–3) Paster
Engl 155: Shakespeare's contemporaries. Engl 156: Historical survey, 1660 to present.

157 **Modern Drama** (3) Paster, Wolf
Representative continental, English, and American plays of the period 1900–1960.

158 **Contemporary Drama** (3) Wolf
Examines drama written since 1960 in the light of postmodernism as both a literary and a theatrical theory. Explores the ways contemporary playwrights and directors challenge the perceptions and assumptions of today's audience.

160 **Early American Literature and Culture** (3) Seavey
The shaping of America's early literary and cultural traditions as shown by significant writers of the Colonial and Early National periods. Bradstreet, Cotton Mather, Edwards, Franklin, Crevecoeur, and others. (Fall)

161 **American Romanticism** (3) Sten
The shaping of America's literary and cultural traditions as shown by significant writers of the Romantic period: Poe, Emerson, Hawthorne, Melville, Thoreau, Whitman, Dickinson, and others. (Spring)

162 **American Realism** (3) Romines
The shaping of America's literary and cultural traditions as shown by significant writers of the Realist period: Twain, James, Crane, Howells, Wharton, Chopin, Robinson, and others. (Fall)

163–64 **American Poetry** (3–3) Ganz, Combs, McAleavey
Close examination of major American poems. Engl 163: From the beginnings through the early 20th century: works by Bradstreet, Taylor, Poe, Emerson,

Whitman, Dickinson, Robinson, Frost, and others. Engl 164: The 20th-century modernist poets: Stevens, Pound, Williams, Eliot, Ransom, Cummings, Crane, and others.

165–66 **American Drama** (3–3) Combs
Engl 165: 19th-century melodrama and the emergence of realism: works by O'Neill and other dramatists of the early 20th century. Engl 166: Developments in modern American drama since World War II, including works by Williams, Miller, Albee, Shepard, Rabe, Guare, Mamet, Henley, Wasserstein, Shange, Hwang, Wilson, and others.

167–68 **The American Novel** (3–3) Maddox, Seavey, Moreland, Sten
Historical and critical study of major works in the American novelistic tradition. Engl 167: From beginnings through the 19th century: Hawthorne, Melville, James, Twain, Dreiser, and others. Engl 168: The 20th century: Wharton, Cather, Anderson, Hemingway, Fitzgerald, Faulkner, Wright, R.P. Warren, Nabokov, and others. (Academic year)

169 **Ethnicity and Place in American Literature** (3) Chu, Romines
The relationships among ethnic identity, authorship, regional setting, and national consciousness. Differences in the literary culture of ethnically, racially, and regionally diverse American populations; how considerations of ethnicity and place have been reshaping the American literary canon. Texts and emphases vary with instructor.

170 **The Short Story** (3) Combs
An extensive survey of short fiction by a wide variety of writers of the 19th and 20th centuries, about half of them American; readings on the art of the short story by writers and literary critics included.

171 **Major Authors** (3) Staff
In-depth studies of a single figure or two or three authors (of British, American, or other nationality) who have written in English. Topics announced in the *Schedule of Classes*; may be repeated for credit provided the topic differs.

172 **Selected Topics in Literature** (3) Staff
Topics announced in the *Schedule of Classes*; may be repeated for credit provided the topic differs. Topics of projected courses include the Bloomsbury group; children's literature; southern literature; science fiction; literature and politics; Freud, Dostoevsky, and Shakespeare.

173 **Selected Topics in Post-Colonial Literature** (3) Dow, Plotz, Sunder Rajan
Historical, critical, and theoretical study of post-colonial literatures—African, Asian, Commonwealth—in English. Topics vary with instructor. May be repeated for credit provided the topic differs.

174 **African American Literature** (3) Wald
Study of texts representing the experiences of black Americans and the ideas and social forces that have shaped their lives and writings.

175 **Gender and Literature** (3) Romines, Wald
Symbolic representations of culturally defined roles and assumptions in literature. Male and female gender roles as fundamental to culture; the representation of culture, in literature especially and in the arts and humanities generally.

176 **Literature and Philosophy** (3) Quitslund
An exploration of features that certain kinds of literary and philosophical texts have in common, noting how the disciplines of philosophy and literary studies differ in their approaches to language and meaning. Readings range from classics, both ancient and modern, to contemporary texts.

177–78 **Contemporary American Literature** (3–3) Moskowitz, Ganz, Chu
Major and representative works, 1946–1980. Engl 177: poetry, fiction, and nonfiction by Flannery O'Connor, Ginsberg, Kerouac, Rich, Lowell, Plath, Mailer, Roethke, Baraka, Berryman, Ashbery, and others. Engl 178: essay, short story, and novel: Warren, Salinger, Agee, White, Cheever, Nabokov, Welty, Wilder, Olsen, Bellow, McPhee, and others.

179 **Special Topics in Literary Theory and/or Cultural Studies** (3) Staff
Selected topics in the diverse theoretical methodologies and interdisciplinary studies that characterize contemporary English and American literary studies. May be repeated for credit provided that topic differs.

187 **Asian American Literature** (3) Chu
The rapidly expanding tradition of literature written by and about Americans of Asian decent. The intersection of Asian American histories and the developing literary tradition; representation of identity, ethnicity, gender; "orientalism."

188 **Jewish American Writing** (3) Plotz
One hundred years of Jewish American writing in fiction, autobiography, poetry, drama, and non-fictional prose. The immigrant experience, American philosemitism and antisemitism, the Holocaust and after, the New York intellectuals, Jewish feminism, and the patriarchal tradition.

195–96 **Honors Seminar** (3–3) Romines, Moreland, Green-Lewis
Genre and genre theory; literature as cultural artifact and as instrument of cultural criticism; various critical approaches—ideological, historical, and ahistorical. Open only to second-semester junior and first-semester senior honors candidates in English. (Engl 195: spring; Engl 196: fall)

197 **Independent Study** (3) Sten and Staff
For exceptional students whose academic objectives are not accommodated in regular courses. Students must obtain the chair's approval and arrange for supervision by an appropriate member of the department. (Fall and spring)

198 **Honors Thesis** (3) Staff
Under the guidance of an instructor, the student writes a thesis on an approved topic. Open only to senior honors candidates in English. (Fall and spring)

199 **Internship: Research and Writing** (3) Quitslund and Staff
Position of responsibility with a publication or an educational or cultural institution or other organization offering practical experience in research and writing. Restricted to junior and senior English majors; requires departmental approval of plans prior to registration. Regular meetings with supervising professor.

ENGLISH AS A FOREIGN LANGUAGE

Associate Professors G.R. Bozzini, C.F. Meloni, B.P. Tyndall (*Chair*), M.A.P. Saunders, J.K. Donaldson, Jr.
Assistant Professors F.C. Reid, M. Kirkland, S. Thompson, A.J. Beley, P. Connerton, C.L. Iacobelli, M.B. Bandas, P.N. Edmondson, R.W. Tucker, C. Matthews, D.L. Weasenforth
Assistant Professorial Lecturers V. Acson, S. Biesenbach-Lucas, P. O'Brien, R. Stratton, A. Taylor, J. Romano

This comprehensive program in English as a foreign language is designed for persons enrolled or planning to enroll in University credit programs, for members of Washington's international community, and for other individuals who wish to improve their command of English through an intensive or semi-intensive study program. International students entering the program must take the EFL Placement Test before registering for any EFL course.

Note: The following course restrictions pertain to students admitted to degree programs who are enrolled in EFL courses. While enrolled in EFL 15, 20, and 30, students may not enroll in other courses. With permission of the advisor (in the case of Columbian School, permission of the dean), students enrolled in EFL 40 may take one other course, and students enrolled in EFL 45 may take two other courses. Students admitted through EFL may take only EFL courses.

In special cases and with the approval of the department, component parts of EFL 15, 20, 30, and 40 can be taken separately. Tuition rates and laboratory fees are charged accordingly.

15 **Basic English** (0) Beley
Introduction to basic grammar, vocabulary, and composition. Development of reading, speaking, and listening skills. Twenty class hours per week. Students registered in EFL 15 will not be permitted to register for any other academic course. Tuition is charged at the rate of 7 credit hours; laboratory fee, $70.

20 **Lower-Intermediate English** (0) Iacobelli, Donaldson
Continued study of basic grammar. Practice in speaking, listening, reading, vocabulary, and composition. Emphasis on integration of skills. Twenty class hours per week. Students registered in EFL 20 will not be permitted to register for any other academic course. Tuition is charged at the rate of 7 credit hours; laboratory fee, $70.

30 **Intermediate English** (0) Matthews, Reid
Continued study of grammar, with emphasis on paragraph writing. Development of academic reading skills and vocabulary. Practice in speaking, pronunciation, listening to academic lectures, and note-taking. Twenty class hours per

week. Students registered in EFL 30 will not be permitted to register for any other academic course. Tuition is charged at the rate of 7 credit hours; laboratory fee, $50.

40 **Higher-Intermediate English** (0) Connerton, Thompson
Skills needed in academic course work: composition, listening comprehension, note-taking, oral communication, reading strategies, vocabulary building, and basic research techniques. Twenty class hours per week. No additional academic work allowed without approval of the advisor. Tuition is charged at the rate of 7 credit hours; laboratory fee, $50.

45 **Semi-Intensive Advanced English** (0) Edmondson, Tyndall, Weasenforth
Emphasis on the research/writing process. Practice in reading university-level materials. Focus on revision and editing. Additional class sessions are offered in specialized skills. Ten class hours per week. Tuition is charged at the rate of 4 credit hours.

46 **EFL Tutorial** (0) Staff
Individualized instruction in specific skill areas. Departmental approval required. Tuition is charged at the rate of 1, 2, or 3 credit hours, depending on the number of hours of instruction.

49 **Semi-Intensive Advanced English for International Graduate Students** (0) Edmondson, Weasenforth
An intensive writing workshop that focuses on academic research, critical reading strategies, and phases of the writing process. Practice in genres of academic writing required across the curriculum. Oral presentations based on written texts. Eight class hours per week. Tuition is charged at the rate of 4 credit hours.

50 **English Composition/Research Methods for International Students** (3) Donaldson, Iacobelli
Expository writing and library research methods course for students who demonstrate high proficiency in English. Four class hours per week. This course can be taken by international students in lieu of Engl 9 or 10. Special fee, $25.

51 **Independent Study** (1 to 3) Staff
Individualized instruction in specific areas. Departmental approval required.

59 **Academic Writing and Research Methods for International Graduate Students** (3) Kirkland
Academic writing and library research methods course for graduate students who demonstrate high proficiency in English. Four class hours per week.

60 **Advanced Oral Communication** (3) Tucker
For students who demonstrate high proficiency in English and wish to improve their formal oral communication skills. Emphasis on interviewing, preparing and delivering informative and persuasive speeches, and leading and participating in small-group discussions. Four class hours per week. Special fee, $25.

61 **American Language and Culture** (3) Beley
For students who demonstrate high proficiency in English. This course emphasizes critical thinking skills through reading, discussion, essay writing, and research reports. Topics on contemporary American culture selected from a wide range of authentic texts, periodic literature, and film. Four class hours per week. Special fee, $25.

62 **America on Film** (3) Iacobelli, Donaldson
For EFL students who demonstrate high proficiency in English and wish to improve their aural/oral communication skills. The course emphasizes aural comprehension and interaction skills through viewing and discussion of films. Selected themes in American culture are traced through a variety of film genres. Prerequisite: EFL 40 or placement in EFL 45. Material fee, $25. (Fall)

70 **American English Pronunciation** (1 or 2) Acson
For EFL students who demonstrate high proficiency in English and wish to improve their pronunciation, intonation, and comprehension skills in American English. The course analyzes the phonetic difference between American English and the native language(s) of the students, enabling them to self-monitor and self-correct. Small group and individual class sessions.

ENVIRONMENTAL STUDIES

Committee on Environmental Studies
H. Merchant (*Chair*), W.C. Parke, A. Viterito, A.M. Yezer

Columbian School of Arts and Sciences offers interdepartmental programs in environmental studies leading to the degree of Bachelor of Arts or Bachelor of Science. By emphasizing the social sciences, the program leading to the degree of Bachelor of Arts is designed to serve the student whose participation in the environmental decision-making process involves integrating information of a less technical nature. The program leading to the degree of Bachelor of Science prepares a student for a role in environmental decision making that involves the interpretation and use of technical information.

Bachelor of Arts with a major in environmental studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. **Prerequisite courses:**
   (a) Statistics—Stat 91.
   (b) Natural sciences—6–8 credit hours selected from BiSc 3–4, 11–12; Chem 11–12, 17–18; Geol 1–2; or Phys 1, 2, 5, 6. BiSc 3–4 must be passed with a grade of *A* or *B* to be accepted toward fulfilling the introductory natural science requirement.
   (c) Social sciences—Econ 11–12, plus 6 credit hours selected from Anth 1–2; Geog 1, 2, 3; PSc 1, 2; Psyc 1, 105–6; or Soc 1.
3. **Required courses for the major (52 credit hours):**
   (a) BiSc 154; Econ 136; Envr 151–52, 157; Geog 132 or 135.
   (b) 9 credit hours selected from BiSc 102, 103, 104, 107, 108, 110, 114, 125, 130, 135, 137, 140 or 142, 152, 155, 156, 157, 158, 167, 168, 169, 208, 242, 243; Chem 22, 50, 105, 122, 151–52, 153–54; Geol 5, 105, 122, 124, 125, 151, 154.
   (c) 24 credit hours in courses selected from no more than two departments in the following—Anth 150, 151, 152, 171, 263, 267; Econ 101, 102, 105, 157, 158, 161, 199, 237; Geog 106, 107, 108, 110, 127, 134, 136, 137, 140, 143, 145, 219, 220, 222; PSc 104, 111, 112, 117, 118, 120, 122, 124, 129; Psyc 104, 144; Soc 120, 181. Up to 6 hours of credit in Envr 159–60 (or other approved field experience or internship courses) may be included in this category.

Bachelor of Science with a major in environmental studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses:
   (a) Statistics—Stat 91.
   (b) Natural sciences—12–18 credit hours selected from BiSc 11–12; Chem 11–12, 17–18; Geol 1–2; Phys 1, 2, 5, 6. Either BiSc 11–12 or Chem 11–12 must be selected.
   (c) Social sciences—Econ 11–12, plus 6 credit hours selected from Anth 1–2, Geog 1, 2, 3; PSc 1, 2; Psyc 1, 105–6; Soc 1.
3. Required courses for the major (52 credit hours):
   (a) BiSc 154; Econ 136; Envr 151–52, 157; Geog 132 or 135.
   (b) 24 credit hours selected from BiSc 102, 103, 104, 107, 108, 110, 114, 125, 130, 135, 137, 140 or 142, 152, 155, 156, 157, 158, 167, 168, 169, 208, 242, 243; Chem 22, 50, 105, 122, 151–52, 153–54; Geol 5, 105, 122, 124, 125, 151, 154. Up to 6 hours of credit in Envr 159–60 (or other approved field experience or internship courses) may be included in this category.
   (c) 9 credit hours in courses selected from no more than two departments in the following—Anth 150, 151, 152, 171, 263, 267; Econ 101, 102, 105, 157, 158, 161, 199, 237; Geog 106, 107, 108, 110, 127, 134, 136, 137, 140, 143, 145, 219, 220, 222; PSc 104, 111, 112, 117, 118, 120, 122, 124, 129; Psyc 104, 144; Soc 120, 181.

For both degrees, the science and social science courses listed under 3(b) and 3(c) must be taken in not more than a total of three departments.

151–52 Senior Seminar in Environmental Studies (3–3) Merchant
Directed reading and discussion of contemporary environmental problems. Limited to majors in environmental studies or with permission of instructor.

157 Introduction to Environmental Law (3) McGuirl
An introduction to selected pieces of major environmental legislation. The role of the courts and bureaucracy in implementing and interpreting legislation. Impact on decision making. Designed for students with no training in law.

159–60 Field Experience (3–3) Staff
Open to juniors and seniors majoring in environmental studies. Students spend at least eight hours per week in a political, technical, legal, or special-interest organization working on environmental questions.

EXERCISE SCIENCE

Information on the Bachelor of Science in the field of exercise science is available from the School of Public Health and Health Services.

FINANCE

Professors F. Amling, T.M. Barnhill, W.E. Seale, W. Handorf, M.S. Klock (*Chair*), J. Jordan
Professorial Lecturer S. Uvanik
Associate Professors J.M. Sachlis, N.G. Cohen, P.S. Peyser, G.M. Jabbour, I.G. Bajeux-Besnainou, M. Eppli
Associate Professorial Lecturer R. Strand
Assistant Professors A.J. Wilson, W.E. Wilson, M. Humber

See the School of Business and Public Management for programs of study leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration.

Departmental prerequisite: BAdm 115 is prerequiste to all courses in the Finance Department.

122 **Intermediate Finance** (3) Humber, Peyser, Sachlis
Theory and practice of acquiring and using funds. Simulations of business decisions by cases and/or models to assess the risk/return interaction of investment, financing, and dividend decisions. (Fall and spring)

123 **Investment and Portfolio Management** (3) Jabbour
Theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk–reward and computer-aided analysis. (Fall and spring)

124 **Advanced Financial Management** (3) Cohen, Humber, Wilson
Analysis and readings covering applications of theory to financial management. Case studies for decision making involving working capital, capital budgeting, financing, dividend policy, and valuation. Prerequisite: Fina 122, 123. (Fall and spring)

132 **Real Estate Investment** (3) Handorf, Eppli
Principles of real estate investment, including valuation, appraisal, financing and development, in addition to a discussion of the mortgage market and its institutions. (Fall)

133 **Fundamentals of Insurance and Risk Management** (3) Staff
Functions of insurance and risk management in business enterprise. (Spring)

135 **Money and Capital Markets** (3) Handorf, Bajeux
The process of capital formation in a free enterprise economy, with special emphasis on factors affecting the level and structure of interest rates. Money market, capital market, and derivative contracts (futures and swaps) are evaluated from both investment and financing perspectives. (Fall and spring)

190 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods.

199 **Independent Study** (arr.)
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

FORENSIC SCIENCES

The Department of Forensic Sciences offers graduate degree programs through Columbian School of Arts and Sciences. The following courses are available to undergraduates.

103–4 **Introduction to Forensic Sciences** (3–3) Rowe
Topics in the application of science to the criminal justice system, including personal identification, analysis of drugs, forms of trace evidence, identification of biological fluids, forensic pathology, and forensic toxicology. Laboratory exercises. Prerequisite: two semesters of a laboratory science other than astronomy

FRENCH

See **Romance Languages and Literatures.**

GEOGRAPHY

Professors D.C. McGrath (*Chair*), J.C. Lowe
Professorial Lecturers B. Thomas, G.T. Foggin, P. Mobley, E. Bruner
Associate Professor M.D. Price
Assistant Professors A. Viterito, D. Fuller

Bachelor of Arts with a major in geography—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Required courses in the major—36 credit hours, including Geog 1, 2, 195, Geol 1 or 5. At least 6 credit hours must be chosen from each of the following groups: Group A (Physical/Environmental/Resources)—Geog 108, 110, 132, 134, 135, 136; Group B (Human)—Geog 125, 127, 140, 141, 145, 146; Group C (Techniques)—Geog 104, 105, 106, 107, 121, 153.

Minor in geography—Required: 21 credit hours, including Geog 1, 2, and one course from each of the groups listed under requirements for the major.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

1 **Introduction to Human Geography** (3) Lowe, Price
A systematic survey of human geography; cultural perspectives on the use of space, including urbanization, geopolitics, and land use. (Fall and spring)

2 **Introduction to Environmental Geography** (3) Fuller, Viterito
A systematic survey of environmental geography; perspectives on environments and human ecology, including ecosystems and their use, human population dynamics, and resource geography. (Fall and spring)

104 **Introduction to Cartography** (3) Mobley
Map interpretation, thematic mapping, and introduction to computer cartography. Laboratory fee, $30.

105 **Techniques of Spatial Analysis** (3) Staff
Nature of geographical inquiry, approaches to the study of geography, empirical research methods.

106 **Geographic Information Systems** (3) Staff
Analysis of cartographic data structures and automated databases. Digitizing and plotting techniques. Laboratory fee, $30. Prerequisite: Geog 105 or permission of instructor.

107 **Remote Sensing and Air Photo Interpretation** (3) Thomas
Remote-sensing techniques using aerial photography, color infrared, microwave, and satellite imagery. Application to rural and urban settings, archaeology, and environmental monitoring. Laboratory fee, $30.

108 **Weather and Climate** (3) Staff
An examination of atmospheric processes and climatic regions. Laboratory fee, $30. Prerequisite: Geog 2.

110 **Climate and Human Ecology** (3) Staff
Effects of climate on human activities. Examination of human-induced climate change. Prerequisite: Geog 2.

115 **Mesoamerican Field Program** (3 or 6) Humphrey, Price
Same as Anth 115.

120 **World Regions: Problems and Prospects** (3) Price
Understanding of world environmental and cultural regions, the natural and human conditions that undergird current problems and future prospects.

121 **Computer Cartography** (3) Mobley
Analysis and application of computer mapping methods. Laboratory fee, $30. Prerequisite: Geog 104.

124 **Urban Transportation** (3) Lowe
The relationship between freight and passenger transportation systems and urban land use patterns and structure. Prerequisite: Geog 1.

125 **Transportation and Communication** (3) Lowe
The structure and evolution of transportation and communication networks and their impact on regional development. Prerequisite: Geog 1.

126 **Industrial Geography** (3) Staff
Theories and case studies dealing with the location, dynamics, and globalization of economic activities. Prerequisite: Geog 1

127 **Population Geography** (3) Staff
Patterns of world population; factors contributing to population pressures, growth, and migrations. Prerequisite: Geog 1.

132 **Environmental Management and Conservation** (3) Staff
The evolution of environmental management philosophies and tools. The global distribution, utilization, and degradation of natural resources. Prerequisite Geog 2.

133 **People, Land, and Food** (3) Foggin
Spatial disparities in world food production, demand, and distribution; regional food–population balances; food supply problems and prospects. Prerequisite Geog 1 or 2.

134 **Energy Resources** (3) Staff
Analysis of regional patterns and trends in consumption and production of energy resources. Examination of international energy linkages and energy policies of selected nations. Prerequisite: Geog 2.

135 **Environmental Quality** (3) Staff
Investigations into questions of resource use and environmental quality. Emphasis on methods of evaluating environmental and societal attitudes as they influence resource use. Prerequisite: Geog 2.

136 **Water Resources** (3) Staff
Analysis of the global spatial patterns, development, use, and quality of water resources. Prerequisite: Geog 2.

137 **Environmental Hazards** (3) Staff
Examination of natural hazards in terms of their types, distributions, and impacts on human activities. Prerequisite: Geog 2.

140 **Urban Geography** (3) Lowe
Analysis of the internal spatial structure of cities; emphasis on patterns and dynamics of location within the city. Prerequisite: Geog 1.

141 **Cities in the Developing World** (3) McGrath
Urbanization processes, problems, and management in the developing world. Focus on urban location, politics, housing, services, employment, and environmental issues. Prerequisite: Geog 1.

143 **Urban Social Geography** (3) Lowe
Behavioral perspectives on human spatial activities in cities. Prerequisite Geog 1.

144 **Explorations in Historical Geography** (3) Staff
Same as AmSt 144.

145 **Cultural Geography** (3) Staff
Analysis of the relationships between culture and environment; emphasis on spatial and ecological considerations. Prerequisite: Geog 1

146 **Political Geography** (3) Price
Interrelationships among the human and physical environment and political systems; the organization of political territories. Prerequisite: Geog 1.

147 **Military Geography** (3) Bruner
An examination of environmental and locational factors and their impact on military planning and operations. Prerequisite: Geog 1 or 2.

151 **Geography of North America** (3) Foggin
An examination of the social, environmental, and economic factors that have led to development of the several regions of the U.S. and Canada. Prerequisite: Geog 1 or 2.

153 **Fundamentals of Urban Planning and Design** (3) McGrath
Studio course in the basic elements of urban planning and design applied to community problems. Survey of planner's role in developing and implementing creative solutions to urban problems.

154 **Geography of the Middle East and North Africa** (3) Staff
Cultural and physical regional patterns of the Middle East and North Africa. Prerequisite: Geog 1 or 2

161 **Geography of Latin America** (3) Price
Examination of spatial characteristics of physical and cultural phenomena in Middle and South America. Prerequisite: Geog 1 or 2.

164 **Geography of Africa** (3) Fuller
Cultural and physical regional patterns of Africa. Prerequisite: Geog 1 or 2.

187 **Building Cities** (3) McGrath
Urban development dynamics and experience in the United States and abroad, including the pressures of social change. Background and insights needed by entrepreneurs and enlightened citizens to comprehend and play effective roles in contemporary city-building. Same as AmSt 187.

189–90 **Readings in Geography** (arr.) Staff
Prerequisite: 12 credit hours of geography and permission of instructor.

195 **Proseminar in Geographic Thought** (3) Price
For students completing the major in geography. Development of geographic thought, theories, and methodologies; geographic curricula. Prerequisite: permission of the advisor.

198 **Special Topics** (3) Staff
Consideration of geographic aspects of topical and future problems of society. May be repeated for credit provided that the topic differs. Prerequisite: Geog 1 or 2.

199 **Internship** (3) Staff
Fieldwork, internship, or other controlled assignment with an agency or organization engaged in work in applied geography. Prerequisite: 12 credit hours of geography courses and permission of instructor.

GEOLOGY

Professors F.R. Siegel, J.F. Lewis, G.C. Stephens (*Chair*)
Adjunct Professor W. Back
Professorial Lecturer J.H. Kravitz
Associate Professor R.P. Tollo
Associate Professorial Lecturer M.J. Baedecker
Assistant Professors W.S. Logan, A.V. Logan (*Research*), R.A. Hanger (*Visiting*), C.M. Fedo
Assistant Professorial Lecturers R. Seal, M.K. Brett-Surman, R.A. Ayuso
Lecturer R.T. Rye

Bachelor of Arts or Bachelor of Science with a major in geology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Required introductory courses—Geol 1 and 2, 2 and 5, 1 and 105, or 5 and 105.
3. Required courses in related areas—(a) Chem 11–12; (b) Math 30 (for the degree of Bachelor of Arts) or Math 30 and 31 (for the degree of Bachelor of Science); (c) Stat 91; and (d) BiSc 11 or 12 or Phys 1 (for the Bachelor of Arts) or BiSc 11 or 12 *and* Phys 1 (for the Bachelor of Science).
4. Required courses in the major—Geol 111, 112, 117, 118, 122, 126, and 151 for both the degrees of Bachelor of Arts and Bachelor of Science; Geol 166, 189, 195 for the Bachelor of Science degree only.

For graduation with Special Honors, a student must have an overall grade-point average of 3.3 plus the recommendation of the department; must take Geol 199 for 2 or 3 credit hours; and must submit an approved honors thesis or project report.

Minor in geology—18 credit hours, including Geol 1 and 2, 2 and 5, 1 and 105, or 5 and 105, plus four courses selected with approval of the departmental advisor.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

1 **Introductory Physical Geology** (3) Rye, Stephens, Tollo
Lecture (2½ hours), laboratory (2 hours). An introduction to the principal features of the composition and structure of the earth. Topics include nature of minerals and rocks, physical processes, mineral and energy resources, and plate tectonics. Laboratory fee, $35. Credit will not be given for both Geol 1 and 5. (Fall and spring)

2 **Environments of the Past** (3) Hanger, Rye, Fedo
Lecture (2½ hours), laboratory (2 hours). An introduction to the history of the earth. Topics include sedimentary environments, plate tectonics, origin of life, and evolution. Laboratory fee, $35. Prerequisite: Geol 1 or 5. (Fall and spring)

5 **Environmental Geology** (3) Hanger, Lewis, Logan, Siegel
Lecture (2½ hours), laboratory (2 hours). An introduction to the impact of geology on the environment, with emphasis on the relation of people and society to natural environments; population evolution, natural hazards, and mineral resources; economic, legal, and political aspects. Laboratory fee, $35. Credit will not be given for both Geol 1 and 5. (Fall and spring)

101 **Water and Its Interactions with Earth Materials** (3) Logan, Siegel
Lecture (2½ hours) and laboratory; field trips as arranged. The interaction of water with rocks and minerals. Groundwater flow and contamination, environmental problems, hydrothermal processes, mineral deposits and acid mine drainage, geothermal energy. Prerequisite: Geol 1 or 5. Laboratory fee, $35. (Spring)

105 **Geological Hazards in Land-Use Planning** (3) Siegel
Lecture and laboratory. An analysis of geological hazards and related factors that affect land-use planning. Field trip. Prerequisite: Geol 1 or 5 or permission of instructor. Laboratory fee, $30. (Spring)

111 **Mineralogy** (4) Tollo
Lecture and laboratory. Introduction to the crystallography and chemical systematics of rock-forming and exotic minerals. Exercises emphasize the analysis of mineralogic data and the paragenesis of mineral assemblages. Prerequisite: Geol 1 or 5 or permission of instructor. Laboratory fee, $30. (Fall)

112 **Optical Mineralogy** (4) Tollo
Lecture and laboratory. Introduction to basic light theory and the identification and characterization of minerals through optical properties. Laboratory exercises provide an introduction to petrologic analysis of igneous and metamorphic mineral systems. Prerequisite: Geol 111 or permission of the instructor. Laboratory fee, $30. (Spring)

117 **Petrology** (2) Lewis
Introduction to silicate phase systems; physics and chemistry of crustal and magmatic processes; volcanic processes and products. Prerequisite: Geol 111, 112; Phys 1 or equivalent; or permission of instructor. (Fall)

118 **Petrology Laboratory** (2) Lewis
Concurrent registration in Geol 117 required for geology majors. Prerequisite: Geol 111 and 112. Laboratory fee, $35. (Fall)

122 **Structural Geology** (4) Stephens
Lecture and laboratory. Study of natural and experimental rock deformation and the relationships between stress and strain as recorded by geologic structures. Prerequisite: Geol 1 or 5. Laboratory fee, $25. (Fall)

124 **Geologic Map Interpretation** (2) Stephens
Interpretation and analysis of geologic maps and cross sections. Prerequisite: Geol 122. Laboratory fee, $25. (Spring)

125 **Marine Geology** (3) Kravitz
Lecture and map work. Principles of oceanography and submarine geology: topography, crustal structure, sedimentary processes, and marine environment. Prerequisite: Geol 1 or 5 or permission of instructor. (Spring)

126 **Sedimentology and Stratigraphy** (4) Fedo
Introduction to sedimentation and stratigraphy; origin and classification of sediments and sedimentary rocks; introduction to clastic and carbonate depositional environments and stratigraphic principles. Prerequisite: Chem 11; Geol 2, 111. (Fall)

128 **Geomorphology** (3) Logan
Lecture (2 hours), laboratory (2 hours). Nature, origin, and development of landforms, identification using maps and photos. Prerequisite: Geol 1 or 5. Laboratory fee, $30. (Spring)

136 **Introduction to Engineering Geology** (3) Lewis
Lecture and laboratory. For students in the School of Engineering and Applied Science. Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Phys 2 or equivalent, or permission of instructor. Laboratory fee, $35. (Spring)

150 **Dinosaurs: Evolution and Natural History** (3) Brett-Surman
An introductory course on the natural history of dinosaurs—their evolution, biology, and ecology, their false portrayal in the press, and how scientists study them. (Spring and summer)

151 **Invertebrate Paleontology** (3) Hanger
Lecture and laboratory. Review of major invertebrate fossil groups. Uses of fossils in studies of macroevolution, paleoecology, biostratigraphy, tectonics, and climatology. Field trips as arranged. Prerequisite: Geol 1 and 2 or 2 and 5 or permission of instructor. Laboratory fee, $30. (Fall)

154 **Vertebrate Paleontology** (3) Brett-Surman
Lecture (2 hours), laboratory or field work as arranged. General features of vertebrate morphology and evolution; problems of paleoecology and adaptation. (Fall, odd years)

166 **Advanced Sedimentology and Stratigraphy** (3) Hanger, Fedo
Development of selected ideas presented in Geol 126; in-depth evaluation of current ideas in sedimentology and stratigraphy, including origin of sedimentary particles, sequence stratigraphy, biostratigraphy. Prerequisite: Geol 112, 126, 151. (Spring)

189 **Geophysics for Geologists** (3) Stephens
Principles of magnetic, gravity, seismic and electrical methods applied to geological problem-solving. Prerequisite: Geol 122 or permission of instructor. (Spring)

195 **Field Methods** (3) Hanger, Stephens
Weekend field trips. Methods of outcrop analysis, geologic mapping, and data interpretation. Students will be responsible for room and board expenses while at field camp (one week). Prerequisite: Geol 122. Laboratory fee (field trip fee), $30. (Spring, odd years)

199 **Undergraduate Research or Reading** (arr.) Staff
Problems approved by the staff. May be repeated once for credit. (Fall and spring)

GERMAN AND SLAVIC LANGUAGES AND LITERATURES

Professorial Lecturer P. Werres
Associate Professors Y. Olkhovsky, R. Robin (*Chair*), P. Rollberg
Associate Professorial Lecturer S. Ficks
Assistant Professors M.R. Gonglewski, M.B. Stein
Adjunct Assistant Professors B.M. Pollack, B.M. Mozdzierz
Assistant Professorial Lecturer J.H. Dick
Instructor J. Rvfa

Bachelor of Arts with a major in German language and literature—The following requirements must be fulfilled.

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Ger 5–6 (or Ger 1–2, 3–4) and Ger 91–92.
3. Required courses in the major—Ger 9–10, 109–10; two courses chosen from Ger 161–62, 165, 166; four courses chosen from Ger 171, 172, 173, 174, 175

Bachelor of Arts with a major in Russian language and literature—The following requirements must be fulfilled.

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Slav 5–6 (or Slav 1–2, 3–4) and Slav 91–92.
3. Required courses in the major—Slav 11–12, 109–10, 161, and 162; two courses chosen from Slav 171, 172, 173, 174; two courses chosen from Slav 165, 166, 185–86.

Special Honors in German—In addition to the general requirements stated under University Regulations, a candidate for special honors in German must have attained a 3.5 grade-point average in the major and at least a 3.0 average overall. Students must apply for honors candidacy by the end of the first semester of the junior year, must attain speaking proficiency at the Advanced level, as measured by the ACTFL Oral Proficiency Interview, and must successfully complete an honors thesis (Ger 197–98).

Special Honors in Russian—In addition to the general requirements stated under University Regulations, a candidate for special honors in Russian must have attained a 3.5 grade-point average in the major and at least a 3.0 average overall. Students must apply for honors candidacy by the end of the first semester of the junior year, must attain speaking proficiency at the Advanced level, as measured by the ACTFL Oral Proficiency Interview, and must successfully complete an honors thesis (Slav 197–98).

Minor in German language and literature—Ger 1–2 and 3–4 (or 5–6), 9–10 (or 101–2), 91–92, and two 100-level German literature or culture courses (Ger 161 through 175).

Minor in Russian language and literature—Slav 1–2 and 3–4 (or 5–6), 9–10 (or 101–2), and four courses chosen from Slav 91–92, 161, 162, 165, 166, 171, 172, 173, 174, 185–86.

Note: Students who are already proficient in German or Russian language or literature may, upon passing a departmental examination, waive any departmental courses below the 100 level as well as up to 6 credit hours of 100-level courses.

Placement Examination: A student who wishes to continue in college the language study begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

GERMAN LANGUAGE AND LITERATURE

1–2 Basic German (4–4) Gonglewski and Staff
First part of beginning course in fundamentals of speaking, understanding, reading, and writing German. Prerequisite to Ger 2: Ger 1. Laboratory fee, $50 per semester. (Academic year)

3–4 Basic German (4–4) Gonglewski and Staff
Second half of beginning course in fundamentals of speaking, understanding, reading, and writing German. Prerequisite to Ger 3: Ger 2 or equivalent. Prerequisite to Ger 4: Ger 3. Laboratory fee, $50 per semester. (Academic year)

5–6 Intensive Basic German (8–8) Gonglewski and Staff
Beginning intensive course in fundamentals of speaking, understanding, reading, and writing German (equivalent to Ger 1–2 and 3–4). Recommended for majors. Prerequisite to Ger 6: Ger 2 or 5 or equivalent. Laboratory fee, $70 per semester. (Academic year)

9–10 Intermediate German (3–3) Gonglewski and Staff
Practice in speaking, listening, reading, and writing at the intermediate level. Prerequisite: Ger 4 or 6 or permission of instructor. Laboratory fee, $50 per semester. (Academic year)

91–92 Introduction to German Literature—in English (3–3) Stein
Ger 91: Survey of German literature from German myths through medieval literature, baroque, and the Enlightenment. Ger 92: Survey of German literature from the "Sturm und Drang" movement through Weimar classicism (Goethe, Schiller), romanticism (E.T.A. Hoffmann, the Brothers Grimm), realism, naturalism, and ending with expressionism. (Academic year)

101–2 Readings in Contemporary German (3–3) Werres and Staff
Representative readings of expository prose from German newspapers, periodicals, and other publications. Prerequisite: for Ger 101, Ger 4 or 6 or equivalent; for Ger 102, Ger 101. (Academic year)

109–10 Advanced German (3–3) Werres and Staff
Practice in speaking, listening, reading, and writing at the advanced level. Prerequisite: Ger 10 or permission of instructor. (Academic year)

161–62 German Culture—in English (3–3) Stein
The central problems, issues, and events that have shaped the development of German culture from antiquity to the present. Emphasis on products and processes of German culture in social, historical, and political contexts. (Academic year)

165 Modern German Literature I—in English (3) Stein
Study of major trends in German literature during the Weimar Republic and the Third Reich, including émigré literature (Brecht, Thomas Mann, Feuchtwanger). (Fall)

166 Modern German Literature II—in English (3) Stein
Study of major developments in post-war East and West German literature (Böll, Grass, Wolf), including some contemporary Swiss and Austrian authors (Frisch, Handke). (Spring)

171 The Age of Goethe—in German (3) Staff
Readings of major works of Weimar classicism in their historical and cultural context.

172 From Romanticism to Realism—in German (3) Stein
Readings in German romanticism, literature of the "young Germany" movement (Heine), and realism (Fontane, Storm).

173 **From Naturalism to Expressionism—in German** (3) Stein and Staff
Study of various literary movements between 1880 and 1914: naturalism, impressionism, symbolism, and expressionism (Hauptmann, Hesse, Thomas Mann, Kafka).

174 **Inside and Outside the Third Reich—in German** (3) Werres
Analysis of literary developments inside the Nazi state (propaganda literature, literature of resistance, and inner immigration) and the literature of exile (Seghers, Remarque).

175 **Literature of Two Germanies—in German** (3) Stein
Evolvement of East and West German literatures after World War II, their separate developments and ultimate unification.

195 **Special Topics** (3) Staff
Directed study of German language, literature, or culture. May be repeated for credit. Students must obtain chair's approval and arrange for supervision by an appropriate member of the department. (Fall and spring)

197–98 **Senior Honors Thesis** (3–3) Staff
Senior honors thesis on a topic related to German language, literature, or culture. Required of and open only to honors candidates in the department. (Academic year)

SLAVIC LANGUAGES AND LITERATURES

1–2 **Basic Russian** (4–4) Robin and Staff
First part of beginning course in fundamentals of speaking, understanding, reading, and writing Russian. Prerequisite to Slav 2: Slav 1. Laboratory fee, $50 per semester. (Academic year)

3–4 **Basic Russian** (4–4) Robin and Staff
Second half of beginning course in fundamentals of speaking, understanding, reading, and writing Russian. Prerequisite to Slav 3: Slav 2 or equivalent. Prerequisite to Slav 4: Slav 3. Laboratory fee, $50 per semester. (Academic year)

5–6 **Intensive Basic Russian** (8–8) Robin and Staff
Beginning intensive course in fundamentals of speaking, understanding, reading, and writing Russian (equivalent to Slav 1–2 and 3–4). Recommended for majors. Prerequisite to Slav 6: Slav 2 or 5 or equivalent. Laboratory fee, $70 per semester. (Academic year)

9–10 **Intermediate Russian** (3–3) Staff
Practice in speaking, listening, reading, and writing at the intermediate level. Prerequisite: Slav 4 or 6 or permission of instructor. (Academic year)

11–12 **Intensive Intermediate Russian** (6–6) Robin and Staff
Intermediate intensive course in speaking, understanding, reading, and writing Russian. Compared to Slav 9–10, includes additional practice in language skills. Prerequisite: Slav 4 or 6 or permission of instructor. Recommended for majors. (Academic year)

21–22 **Basic Czech** (3–3) Staff
Beginning course in fundamentals of speaking, understanding, reading, and writing Czech. Prerequisite to Slav 22: Slav 21 or equivalent. Laboratory fee, $50 per semester. (Academic year)

23–24 **Basic Second-Year Czech** (3–3) Staff
Second half of beginning course in fundamentals of speaking, understanding, reading, and writing Czech. Prerequisite to Slav 23: Slav 22; prerequisite to Slav 24: Slav 23. (Academic year)

31–32 **Basic Polish** (3–3) Staff
Beginning course in fundamentals of speaking, understanding, reading, and writing Polish. Prerequisite to Slav 32: Slav 31. (Offered when the demand warrants)

91–92 **Introduction to Russian Literature** (3–3) Rollberg
(In English.) Slav 91: Russian literature and society, 1800–1860s, concentrating on the Golden Age of Russian literature, poems and stories by Pushkin, Lermontov, Gogol, and Turgenev. Slav 92: Russian literature and society on their way to modernity: great works of prose and drama by Dostoevsky, Tolstoy, Chekhov, and Bunin. (Academic year)

101–2 **Readings in the Russian Press** (3–3) Ficks
Representative reading of Russian periodicals and current publications. Prerequisite: Slav 4 or 6 or permission of instructor.

109–10 **Russia Today: Topics in Advanced Russian** (3–3) Rollberg and Staff
Practice in speaking, listening, reading, and writing at the advanced level. **Prerequisite: Slav 10 or 12 or permission of instructor.** (Academic year)

151–52 **Literature and Culture of the Western Slavs—in English** (3–3) Ryfa
A broad overview of the cultural developments in Western Slavic nations (Poles, Czechs, and Slovaks) from the dawn of Slavic literacy in the ninth century to the present. An interdisciplinary and comparative approach covers a wide range of cultural fields: the history of the region, literature, architecture, visual arts, science, philosophy, music, and religion.

161 **Russian Culture to 1825** (3) Olkhovsky
Survey of Russian cultural heritage from its ancient origins through the early 19th century. Architecture from the medieval period through the end of the Empire style. Iconography, the influence of the Church, and effects of the West on Russian culture.

162 **Russian Culture since 1825** (3) Olkhovsky
Survey of Russian culture from the 19th century through the present, including intellectual movements; realism in music, art, and theatre; ballet; avant-garde painting; and effects of Soviet policies and of Perestroika.

165 **Russian Literature from the Revolution to World War II** (3) Ryfa
Basic themes, trends, and literary figures of the 1920s and 1930s; the impact of the revolution on writers and literature; emergence of socialist realism—in English.

166 **Russian Literature from World War II to the Present** (3) Ryfa
Literature in wartime and in postwar years: the "thaws," the new generation of writers, and new trends in literature since the 1960s—in English.

171 **19th-Century Russian Prose** (3) Ryfa
Reading and discussion of selected prose texts of the 19th century—in Russian. **Prerequisite: Slav 10 or 12 or equivalent; Slav 91–92.** (Fall, even years)

172 **19th-Century Russian Poetry** (3) Ryfa
Reading and discussion of selected poetry of the 19th century—in Russian. (Spring, odd years)

173 **20th-Century Russian Prose** (3) Ryfa
Reading and discussion of selected prose of the 20th century—in Russian. (Fall, odd years)

174 **20th-Century Russian Poetry** (3) Ryfa
Reading and discussion of selected poetry of the 20th century—in Russian. **Prerequisite: Slav 10 or 12 or equivalent; Slav 165, 166.** (Spring, even years)

185–86 **Introduction to Russian Cinema** (3–3) Rollberg
(In English, all films subtitled.) Slav 185: From Russian silents to the introduction of sound and color (1896–1946). The great revolutionary directors—Eisenstein, Pudovkin, Dovzhenko. Slav 186: From post-war to post-perestroika cinema (1946–1996): war films, adventure, films about youth.

195 **Special Topics** (3) Staff
Directed study of East European languages, literatures, or cultures. May be repeated for credit. Students must obtain chair's approval and arrange for supervision by an appropriate member of the department. Prerequisite for Russian: **Slav 9–10 or 11–12, 91–92, 165, 166.**

197–98 **Senior Honors Thesis** (3–3) Staff
Senior honors thesis on a topic related to Russian language, literature, or culture. Required of and open only to honors candidates in the department.

GREEK and HEBREW

See **Classics.**

HEALTH SCIENCES

The following courses, offered by the Health Sciences Programs in the School of Medicine and Health Sciences, are available to undergraduates across the University. Prerequisites may be established for the courses. For information on bachelor's degree programs in health sciences, please contact the School of Medicine and Health Sciences.

101 **Psychosocial Aspects of Health and Illness** (3)
Comprehensive introduction to the psychological and social aspects of health and wellness. Emphasis on the development of communication skills and the establishment of caring relationships. Discussions of special situations such as working with dying patients and patients with self-destructive behaviors.

102 **Pathophysiology** (3)
Biomedical and scientific framework for the understanding of human disease mechanisms and biologic processes. Lecture presentations cover infectious, immunologic, cardiovascular, genetic, respiratory, gastrointestinal, neoplastic, reproductive, renal, hematologic, neurologic, and musculoskeletal diseases.

103 **Health Policy and the Health Care System** (3)
Incorporates economic theory and policy analysis methodology to analyze the impact of changes in the health care system on the practice of health sciences professionals and the quality and process of health care. Development of critical thinking skills through review of current medical literature.

104 **Management of Health Science Services** (3)
Application of management and organizational principles to the delivery of services provided by health sciences disciplines. Issues addressed include information systems, leadership, team building, fiscal management, human resources management, quality improvement, and management of conflict and change.

HISTORY

Professors H.M. Sachar, L.G. DePauw, R. Thornton, P.F. Klarén, R.E. Kennedy, Jr., W.H. Becker, L.P. Ribuffo, E. Berkowitz, R.H. Spector (*Chair*), J.O. Horton, H.F. Gillette, Jr., L.L. Peck, H. Judson (*Research*), M.E. Saperstein
Associate Professors C.J. Herber, R.A. Hadley, A.D. Andrews, M.A. Atkin, R.B. Stott, H.L. Agnew, E.A. McCord, C.E. Harrison, D.R. Khoury, T. Anbinder
Adjunct Associate Professor K. Bowling
Assistant Professors A.L. Alexander, D. Yang, J. Hershberg, S. McHale
Director and Principal Investigator of the First Federal Congress Project C. Bicklord

Bachelor of Arts with a major in history—The following requirements must be fulfilled:

1. Majors must meet the general requirements of Columbian School of Arts and Sciences, selecting specific courses in consultation with either a departmental or college advisor. For the foreign language or culture requirement, majors must meet the foreign language, rather than foreign culture, requirement.

2. Majors must either take or waive three of the following four introductory courses: Hist 39–40 and 71–72. Waiver may be accomplished by passing a departmental examination, which is held near the beginning of classes. Credit as well as waiver may be obtained by departmental examination or by scoring 4 or 5 on the Advanced Placement Examination, and waiver may be obtained by scoring 650 or above on the College Board Achievement Test. Neither waiver nor credit is awarded by CLEP subject examination.

3. Majors must complete Hist 198 and 199, plus seven courses chosen from groups (a), (b), and (c), below, with the following distribution: at least three courses from one of the groups, at least two courses from a second group, at least one course from the third group, with the seventh course chosen from any of the three groups.

(a) Europe—Hist 109, 110, 111, 112, 121, 122, 123, 124, 125, 131, 132, 136, 141, 142, 148, 151, 152, 153, 154, 155, 156, 157, 158

(b) United States—Hist 117, 126, 127, 129, 130, 133, 134, 137, 138, 139, 140, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 182, 184, 186, 197

(c) Russia, Asia, Africa, and Latin America—Hist 107, 108, 116, 118, 126, 127, 145, 146, 158, 161, 162, 163, 164, 187, 188, 189, 193, 194, 195, 196

Special topics courses numbered 101 and courses in the 700 Series may also satisfy one of the three field requirements. Majors should check with the major advisor on the applicability of such courses.

For Special Honors in history, a history major must (1) meet the general honors requirements listed under University Regulations, (2) apply for honors candidacy and complete Hist 199 before the end of the junior year, and (3) in the ensuing semester, enlarge upon the research project undertaken in Hist 199 while enrolled in Hist 191. Only if the thesis completed in Hist 191 merits the grade of *A* will Special Honors be recommended.

Minor in history—Undergraduate students who select a minor in history must ordinarily declare their intention to the departmental advisor no later than the beginning of their senior year. Such students may choose a nonspecialized history curriculum, or may concentrate in one area, such as ancient history, medieval history, early modern Europe, modern Europe, the Middle East, Russia and East Europe, the United States, Latin America, or the Far East, or in one field, such as economic, social, intellectual, diplomatic, political, black, or women's history. In each case the program of courses will be planned in consultation with the history advisor. To meet the departmental requirements for a minor, the student must complete one course chosen from Hist 39, 40, 71, or 72 and at least five additional approved 100-level history courses with a grade of *C*– or above.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Waiver Examinations: Waiver examinations are given three times per year, near the beginning of classes in the fall and spring semesters and the first summer session.

Course Accessibility: All 100-level courses are open to students without history course prerequisites with the exception of Hist 136, 157, 198, and 199.

39–40 **European Civilization in Its World Context** (3–3) Staff
Hist 39: Introduction to the political, social, economic, religious, and cultural history of Europe from about 800 A.D. to 1715. Hist 40: From 1715 to the present. (Academic year)

50 **Washington, D.C.: History, Culture, and Politics** (3) Gillette
Same as AmSt/PSc 50.

71–72 **Introduction to American History** (3–3) Staff
Hist 71: political, social, economic, and cultural forces of the United States from the earliest settlements to 1876. Hist 72: from 1876 to present. (Academic year)

101 **Special Topics** (3) Staff
Historical perspectives on great issues of past and present. The topic each semester will be announced in the *Schedule of Classes*

105 **European Civilization to 800 A.D.** (3) Hadley
Introduction to the political, social, economic, and religious history of Europe from the beginnings of recorded history to 800 A.D.

107 **The Ancient Near East and Egypt to 322 B.C.** (3) Hadley
Survey of Egyptian, Mesopotamian, Anatolian, West Semitic, and Iranian civilizations from the Neolithic period to Alexander's conquest.

108 **Greece and the Near East, 359 B.C. to the Second Century A.D.** (3) Hadley
Survey of cultural, social, political, and economic developments in the Hellenistic world and societies of the Near East from the reign of Philip II to the height of Roman power and influence in these regions.

109 **Early Aegean and Greek Civilizations to 338 B.C.** (3) Hadley
Neolithic background; Bronze Age—Minoan, Helladic, and Mycenaean civilizations; classical Greek civilization to the Macedonian conquest. (Fall)

110 **The Roman World to 337 A.D.** (3) Hadley
Prehistoric Italy, rise and decline of the Roman Empire and Latin civilization; cultural, social, and political developments in the Greek world under Roman rule. (Spring)

111–12 **Medieval History** (3–3) Andrews
Hist 111: Evolution of the Roman Empire into the Byzantine and Islamic cultures and new societies in the West; the rise of Latin Christendom until about 1050 A.D. Hist 112: Medieval European daily life, institutions, and creative movements to about 1400. (Academic year)

116 **History of Africa** (3) Staff
Survey of political, cultural, and economic development from ancient times to the present, with emphasis on the rise and demise of European colonialism.

117 **Crisis or Conspiracy? A History of the International Politics of Oil** (3) Becker
The history of the international politics of oil, with special attention to developing relationships between major oil companies and governments here and abroad. (Summer)

118 **China to 1800** (3) McCord
Survey of Chinese civilization from its ancient beginnings to the last imperial dynasty. (Fall)

121 **The Renaissance in Western Europe** (3) Staff
Study of the economic, political, intellectual, and cultural acceleration in Western Europe, beginning in the Italian city-states and spreading to France, Germany, and England, in the 14th through 16th centuries. (Fall)

122 **The Reformation in Western Europe** (3) Herber
Religious, political, and social consequences of the theological upheavals of the 16th century. (Spring)

123–24 **European Intellectual History** (3–3) Kennedy
Hist 123: The "Century of Genius" and the Enlightenment, God, nature, man, and society, from Descartes to the French Revolution. Hist 124: Responses to the French Revolution and the Enlightenment: historicism, evolution; nihilism, psychoanalysis; communism; fascism; existentialism, structuralism, postmodernism, and neo-orthodoxy. (Alternate academic years)

125 **Women in European History** (3) Peck
A study of the role of women in the political, social, intellectual, and economic life of Europe from the Middle Ages to the 20th century. (Spring)

126 **The United States and the Wars in Indochina, 1945–1975** Spector
The American role in the Indochina Wars, emphasizing the period 1961–1975, and from the perspectives of the Vietnamese, French, and Americans in Vietnam. Related intellectual and political developments in the United States. Cold War relationships with China and the Soviet Union. (Fall)

127 **The U.S., Japan, and East Asia Since 1900** (3) Spector
U.S. relations with East Asia, highlighting the U.S.–Japanese political, economic, and cultural encounter and the US–Japanese–Chinese relationship; some attention to U.S. relations with Korea and Southeast Asia. (Spring)

129 **War and the Military in American Society from the Revolution to the Gulf War** (3) Spector
Social and psychological dimensions of war and military service. (Spring)

130 **The Gilded Age, 1877–1900** (3) Anbinder
Emphasis on industrialization and its impact on workers; urbanization, immigration, and race relations; and the transformation of the political system as it attempted to deal with these changes. (Fall)

131–32 **History of Germany** (3–3) Herber
Political, social, and cultural development. Hist 131: From mid-17th century to Bismarck. Hist 132: From William II to the present. (Academic year)

133 **Recent U.S. History, 1890–1945** (3) Ribuffo
Political, social, diplomatic, and intellectual developments, with particular emphasis on the "searching" '20s and New Deal. (Fall)

134 **Contemporary U.S. History Since 1945** (3) Ribuffo
Political, social, diplomatic, and intellectual developments, with particular emphasis on the Cold War, "silent" '50s, and disrupted '60s. (Spring)

136 **Europe in the 20th Century** (3) Sachar
Diplomatic, political, and cultural developments from the turn of the century to the present. Credit may not be earned for both Hist 136 and 157. Prerequisite: Hist 40. (Spring)

137–38 **History of American Foreign Policy Since World War II** (3–3) Thornton
Emphasis on American and Soviet strategy and foreign policy in the era of the Cold War. Hist 137: World War II to the Vietnam War; Hist 138: Vietnam to the "New World Order." (Academic year)

139–40 **Women in the United States** (3–3) Murphy, Harrison
Survey of women's experience in U.S. history, the way gender has organized relations of power, and the impact of race, region, class, and ethnicity on women and on gender roles. (Academic year)

141–42 **History of France** (3–3) Kennedy
Hist 141: Old Regime: monarchy and social classes; the Church; the Enlightenment; the 1789 revolution; Napoleon. Hist 142: From 1814: breaks and continuities in the succession of regimes; the interplay between revolution and tradition; the weakened international position of France; Gaullism and the survival of France; European Unity. (Alternate academic years)

145 **Russia to 1801** (3) Atkin
Survey of Russian history from the rise of the Kievan confederation in the ninth century to the establishment of Imperial Russia as a European great power. Attention will be given to the political, socioeconomic, and cultural history of the East Slavs, especially the Russians. (Fall)

146 **Russia Since 1801** (3) Atkin
Survey of Russian and Soviet history from the reign of Alexander I to the post-Stalin era. Attention will be given to the contending forces of revolution, reform, and conservatism; diplomatic relations; economic development; and social change. (Spring)

148 **The French Revolution** (3) Kennedy
Social, political, economic, and cultural history of the decade of revolution, 1789–1799. Attention to its structural consequences in France and in Europe at large. (Summer)

151–52 **History of England** (3–3) Peck
Development of English civilization and its impact on Western culture. Hist 151: To 1689. Hist 152: Since 1689. (Academic year)

153 **Tudor England** (3) Peck
Aspects of the constitutional, social, intellectual, economic, and religious development of England, 1485–1603. (Fall)

154 **Stuart England** (3) Peck
The civil wars, Restoration, and Glorious Revolution. Political, religious, socioeconomic, and intellectual developments in England, 1603–1714. (Spring)

155 **History of Modern Ireland** (3) Stafi
The political and cultural development of Ireland since the Middle Ages and the continuing interaction between Ireland and England, with emphasis on the period from the Act of Union of 1801 to the Partition of 1923.

156 **Science and the Modern World** (3) Schlagel
Same as Phil 151.

157 **20th-Century European Diplomatic History** (3) Sachar
The main currents, with necessary 19th-century background. Credit may not be earned for both Hist 136 and 157. Prerequisite: Hist 40. (Fall)

158 **Modern Jewish History** (3) Sachar
A secular history of the Jewish people from the 18th century to the present state of Israel, emphasis on European political, economic, and cultural influences. (Spring)

161 **Revolution in 20th-Century Latin America** (3) Klaren
Examination of the major social revolutions in modern Latin America, especially in Mexico, Bolivia, Cuba, and Nicaragua; their origins, ideology, process, and outcomes. (Fall)

162 **20th-Century Latin America** (3) Klaren
A survey of the main societal trends shaping Latin America in this century, with particular emphasis on such themes as populism, urbanization, reformism, modernization, nationalism, revolution, the military dictatorship, and the development process. (Spring)

163–64 **History of Latin America** (3–3) Klaren
Hist 163: Analysis of Spanish and Portuguese imperialism in the New World, 1492–1820. Hist 164: A problems approach to Latin America, 1820 to the present, thematic emphasis on neocolonialism, corporatism, liberalism, *caudillismo*, modernization, populism, and revolution. (Academic year)

166 **Immigration, Ethnicity, and the American Experience** (3) Anblinder
Examination of the role of immigration, ethnicity, and ethnic conflict in American life, past and present, with particular attention to the urban immigrant experience, and the prevalence of anti-immigrant sentiment throughout U.S. history. (Fall)

167 **Themes in U.S. Cultural History** (3) Gillette, Mergen
Same as AmSt 167.

168 **Colonial America** (3) DePauw
The migration of Europeans and Africans into North America and the political structures, social institutions, and cultures that they and the indigenous peoples created during the 17th and 18th centuries. (Fall, alternate years)

169 **The American Revolution** (3) DePauw
The political, intellectual, social, military, and economic impact of the events surrounding the separation of the United States from the British Empire. Special attention to the influence of non-elite groups. (Spring, alternate years)

171–72 **U.S. Social History** (3–3) Horton, Stott
Hist 171: Daily life, institutions, intellectual and artistic achievements of the agrarian era, 1607–1861. Hist 172: The urban–industrial era from 1861 to present. Same as AmSt 171–72. (Academic year)

173 **African American History** (3) Horton, Alexander
Survey of the African American experience, emphasizing the contributions of black Americans to and their impact upon American history. Same as AmSt 173. (Fall)

174 **Special Topics in African American History** (3) **Horton**
Concentration on specific issues central to the African American experience. Consult *Schedule of Classes* for issues to be addressed. (Spring)

175 **U.S. Constitutional History** (3) Harrison
Examination of the text and interpretation of the document that is the foundation of the American government, with special attention to the changing character of race and gender as constitutional classes. (Fall, alternate years)

176 **The Modern American Presidency** (3) **Berkowitz**
The development of the modern American presidency, from Theodore Roosevelt to Bill Clinton, examining the intersection of personal and impersonal forces in the creation of modern America

177 **The Jacksonian Era and the Rise of Mass Politics** (3) Anbinder
The period 1828–1860 and its continuing significance to American society; emphasis on racial and gender divisions and changes in the legal and political systems. (Fall, alternate years)

178 **History of the American West** (3) Stott
The interaction of environment and cultures among the different peoples vying for occupancy of the trans-Mississippi region of the United States from the early 19th century to the present. (Fall)

179 **U.S. Economic History** (3) Berkowitz
Survey of American economic history from colonial times to the present. Particular attention is given to the economics of slavery, the development of a national industrial economy, and the growth of the federal government as an influence on economic policy.

182 **U.S. Diplomatic History** (3) **Hershberg**
American foreign relations in the 20th century.

183 **History of Women in War** (3) DePauw
Survey of women's roles in war from 6500 B.C. to the present. Emphasis on Western warfare. (Fall, alternate years)

184 **Civil War and Reconstruction** (3) DePauw
How tensions between the sections developed into violence, how a total war was fought on American soil, and how the experience of war affected the generation that lived through it. (Spring, alternate years)

186 **U.S. Urban History** (3) Gillette, Stott
The American city from colonial foundations to the present, relating social and economic forces to physical form. Special emphasis on transitions from preindustrial to industrial to metropolitan forms, focusing on implications for public policy and historic preservation. Same as AmSt 186. (Fall)

187 **History of Modern China** (3) McCord
China since 1840, with particular attention to political developments. (Fall)

188 **History of Chinese Communism** (3) Thornton
Survey of the leadership, ideology, structure, and foreign and domestic policies of the Chinese Communist Party from its inception to the present (Fall)

189 **History of Modern Japan** (3) Yang
Japan's century of modernization—from the Meiji Restoration of 1868 to the present. Emphasis on historical, political, economic, and cultural factors. (Fall)

190 **Ethnohistory** (3) **Staff**
Same as Anth 190

191 **Senior Honors Thesis** (3) **Staff**
Required of and open only to undergraduate honors candidates in history

193 **History of the Middle East** (3) Khoury
Byzantine, Arab, Persian, and Islamic backgrounds; rise and decline of the Ottoman Empire; action of European powers in the area; Ottoman breakup into the Turkish Republic and other states. (Fall)

194 **History of the Modern Middle East** (3) Khoury
Beginning with Napoleon's invasion of Egypt. Development of nationalism and of modern states; impact of the West on culture and institutions; great-power imperialism; crises of Turkish Straits, Suez, Arab–Israeli relations; and other issues. (Spring)

195 **Traditional Civilizations of East Asia** (3) McCord, Yang
Intellectual, institutional, and social development of the traditional civilizations of China, Japan, and Korea from their origins to 1800. (Fall)

196 **The Modern Transformation of East Asia** (3) McCord, Yang
The social, institutional, and intellectual transformation of China, Japan, and Korea from the mid-19th century to the present. (Spring)

197 **Oral History and Interview Techniques** (3) Staff
Same as AmSt/Anth 197.

198 **Readings for the History Major** (3) Staff
Required of history majors; this course should be taken during the junior year. Readings and discussions on major trends in history; representative selections from the classics of historical literature. Students who receive credit for Hist 198 cannot receive credit for Hist 201. (Fall and spring)

199 **Undergraduate Research Seminar** (3) Staff
Required of senior history majors, history minors, and students taking history as a secondary field. Normally to be taken after completing Hist 198. (Spring and fall)

HONORS

University Honors Program Committee
D.A. Grier (*Director*), R.S. French (*Associate Director*), C.E. Dexter (*Assistant Director*), A. Altman, R.S. Goldfarb, D. Jones, J. Kasle, E. McCord, L.C. Moersen, D. Rowley, M.J. Sodaro, R. Tollo, T.G. Wallace

The University Honors Program offers a program of enhanced study to undergraduates at The George Washington University. Incoming students may apply to the program when they apply for admission to the University. Current GW students may apply to the Honors Program Office to join the program.

Scholastic Requirements—All Honors Program students must take at least one Honors course each semester and must maintain a cumulative GPA of 3.4 or higher. For each semester that an Honors student meets this requirement, his or her transcript will be marked "University Honors Program Scholar." Students who fail to maintain a cumulative GPA greater than 3.4 or fail to take an Honors course are considered probationary members and have their transcript marked "Member, University Honors Program." Students whose cumulative GPA falls to the level from which it is impossible to graduate with a cumulative GPA of 3.4 or higher are removed from the Program. Freshman students who fail to maintain a cumulative GPA of 3.0 are removed from the Program.

General Requirements—Freshman students must take Honr 15–16, the Honors first-year proseminar, and may take in addition any Honors course numbered below 100. Each student in the Honors Program must complete a senior thesis or research project. This project may be an Honors senior thesis, the course, seminar, or paper for departmental special honors; or one of the senior seminars offered by the Honors Program. Under appropriate conditions, the senior project may be done during the student's junior year.

Students may get Honors credit for internships or regular University courses by making arrangements through the Honors Program Office. CSAS and ESIA students who wish to do this must have completed 60 credit hours of course work; SBPM and SEAS students must have completed 30 hours.

Honors Courses—The Honors Program offers a wide range of courses that varies from semester to semester, depending upon the availability of faculty and department resources. The Honors Program Office provides a current list of courses offered. Honors courses numbered 100 and below are open to all Honors Program students and fulfill curriculum requirements in at least one of the schools. Courses numbered 101 to 179 are open to all sophomore, junior, and senior Honors Program students and other qualified students

on a space-available basis. (Other qualified students are those who meet the grade-point requirements that students in the Honors Program must maintain at that level.) Courses numbered in the 180s are open to all junior and senior Honors Program students, and courses in the 190s are senior seminars.

When an Honors course covers the content of a departmental course, credit is not allowed for both. Please check with the Honors Program Office for a list of course equivalents. In most instances applicable Honors courses may be substituted for program requirements; students should consult with their advisor to determine applicability.

A full description of the University Honors Program is provided in the Honors Program Handbook, available at the Honors Program Office.

15–16 Honors Proseminar: Ancient Origins (3–3) Dexter
Required for first-year students in the Honors Program, but may be taken by others. The central texts and major ideas of Western civilization that form the fundamental bases of modern thought. (Academic year)

28 Chance (3) Smythe
Statistical reasoning as it relates to public policy, particularly medical, economic, and social policy. Emphasis on the philosophical basis of statistics. (Fall)

33–34 Honors General Chemistry (4–4) Blackburn
An accelerated introductory chemistry course that includes special and advanced topics. Emphasis on laboratory research. Prerequisite: one year each of high school algebra and chemistry with laboratory and a course in trigonometry. (Academic year)

36 Honors Geology (4) Tollo
An introduction to the fundamental principles of geology and the geologic processes that shape and modify the planet. Field trips provide extensive first-hand research experience. (Fall, even years)

42 Honors Sociocultural Anthropology (3) Krulfeld
An accelerated introduction to the study of cultures that emphasizes field research. (Fall)

43 Honors Microeconomics (3) Goldfarb
An introductory microeconomics course that considers both the philosophical basis of economics as well as its methods and applications. (Fall)

44 Honors Macroeconomics (3) Bradley
An accelerated introductory macroeconomics course that includes the study of special topics. (Spring)

53 Honors Topics in Music (3) Youens
Special topics of musicology studied with respect to its cultural and historical context. (Fall)

59 Honors Introduction to Acting (3) Garner, Wade
Practical acting skills and the theory underlying method acting. Emphasis on the writings of Stanislavsky and his followers. (Fall and spring)

63–64 Honors English Literature (3–3) T. Wallace, Soltan
A survey of English literature emphasizing modern theory-based criticism. Honr 63. From the Middle Ages to the Enlightenment. Honr 64. From the Enlightenment to the Modernist period. (Academic year)

76 Constitution and Public Service (3) Framer
This course examines the defining documents of the United States in the context of public service. Readings include the Constitution, the Federalist Papers, and the Gettysburg Address. (Fall)

81–82 Ancient Greek Language and Culture (4–4) Fisher
An introductory-level study of classical Greek language and culture. Greek grammar, vocabulary, and reading together with readings in English about ancient Greek society and culture. (Academic year)

83–84 Latin Language and Roman Culture (4–4) Dexter
An introductory-level study of Latin language and Roman culture. Latin grammar, vocabulary, and reading together with readings in English about ancient Roman society and culture. (Academic year)

92 Business Law: A Comparative International Approach (3) Moersen
A comparative analysis of business law in the United States and other common law countries, as well as countries following other legal traditions. Emphasis on international transactions. (Spring)

110 **Honors University Symposium** (1) Grier
An intensive two-day course that brings together a prominent speaker in a selected field and University faculty and students for lectures and discussion groups. (Fall and spring)

112 **Intercultural Psychology** (3) Zea
A seminar-style course that examines the importance of a cross-cultural perspective in order to eliminate bias and ethnocentrism in the study of psychology. (Spring)

123 **State and Society in the Middle East** (3) N. Brown
Study of the relationship between Middle Eastern governments and the societies they govern. Readings include literary and primary sources. (Fall)

125 **Justice and the Legal System** (3) Kasle
An examination of justice from a legal and philosophical point of view. The course will be taught as a law class using the Socratic method. (Fall)

136 **Issues and Innovation in American Education** (3) Paley
An introductory course that explores various spheres in American educational thought and practice. Readings and field experience focus on the development and transformations of American education. Historical, psychological, sociological, and pedagogical standpoints are considered. (Spring)

170 **Special Topics in Literature and Theatre** (3) Staff
This course examines dramatic texts across historical periods and regional or national boundaries. Modern critical theory dealing with concepts of the self the other, the family, and the community that have shaped the individual's sense of identity and the role of theatre in society. (Spring)

175 **Honors Special Topics** (1 to 3) Staff
Topics are announced in the *Schedule of Classes* and the Honors Preregistration newsletter. (Fall and spring)

180 **Honors Contract** (0)
Contractual learning in tandem with a non-Honors course. Allows in-depth study to enhance the student's knowledge of the methods and the material of a course. (Fall and spring)

182 **Honors Internship** (1 to 3) Grier
Off-campus internship, usually in the student's major field. Includes regular assignments to put the work in a broader context. (Fall and spring)

184 **Honors Independent Study** (3) Grier
Independent study in a topic outside the standard curriculum.

196 **Honors ESIA Senior Seminar** (3) East
This course compares the ways nations conduct their foreign policies on various issues. Collaborative projects. Topics vary. Fulfills Honors senior thesis requirement. (Fall and spring)

198 **Honors Thesis** (3) Grier
A one- or two-semester thesis under faculty guidance. May be repeated for credit. (Fall and spring)

199 **Senior Seminar** (3) Grier
Interdisciplinary approach to the Honors senior thesis requirement. Includes a weekly seminar to discuss the emergence of ideas while working on thesis. (Fall and spring)

HUMANITIES

Humanities Steering Committee
M. Dow (*Coordinator*), D. Bjelajac, J. Chaves, R.P. Churchill, C.E. Dexter, D. Khoury, M.F. Pankin, J. Quitslund, J.-F. Thibault, M. Ticktin, D.D. Wallace, L. Youens

Columbian School of Arts and Sciences offers the courses listed here as an interdisciplinary approach to the study of the humanities. Hmn 1 through 5 and 11–12 are designed to provide a coherent introduction to Western culture. Hmn 6, 7, and 8 provide introductions to the cultures of Asia, Africa, and the Islamic world. With some variations among instructors, the courses deal with historical figures and events; creative works of art, literature, and music; and systems of philosophy and religious traditions.

1 **Roots of the Western Tradition** (3) Staff
Basic ideas of Western thought from early Greek, Roman, Judaic, and Christian traditions. Representative readings in drama, epic, historical writings, orator-

creation stories, scriptural traditions, philosophy, and spiritual autobiography. (Fall and spring)

2 **Ideas in Western Culture: Aquinas to Locke** (3) Staff
An examination in historical context of central texts from the Middle Ages, the Renaissance, and the Enlightenment: Aquinas, Dante, Machiavelli, Erasmus, Luther, Montaigne, Bacon, Shakespeare, Rabelais, Descartes, Milton, and Locke. (Fall and spring)

3 **The Enlightenment** (3) Scarboro, Ganz
Primary works representative of 18th-century European and American culture, examined from thematic and historical perspectives. Music, drama, poetry, the novel, art, architecture, economics, philosophy, and science are among the subjects included; 18th-century notions of Nature, reason, liberty, equality, natural law, and the question of human perfectibility. (Fall)

4 **Romanticism and Revolution: The 19th Century** (3) Guenther, Ganz
Major themes of 19th-century culture from 1789 to 1900 in representative works of European and American art, literature, music, drama, philosophy, and theology. The 19th-century resources of Washington—museums, monuments, collections, concerts, plays—form part of the curriculum. (Fall)

5 **The 20th-Century Consciousness** (3) Staff
Major themes and paradigms of 20th-century civilization as expressed in key literary and philosophic texts, visual arts, music, and cultural artifacts. Key issues include the meaning of history in the age of two world wars, the Holocaust and the crisis of reason; the authority of science; the decline of Western hegemony; modernism and postmodernism. (Spring)

6 **Asian Humanities** (3) Chaves, Kim-Renaud
The traditional art and literature of the cultures of South Asia (India, Pakistan, Sri Lanka, Tibet) and East Asia (China, Korea, Japan). Attention to religious and philosophical systems as well as to continuities and changes in modern Asian culture. (Fall)

7 **African Humanities** (3) Dow, Brooks, Vlach
An introduction to the literature, art, and philosophy of the African continent in historical, cultural, and geographic contexts. Overview of sculpture, rock painting, and architecture; the oral tradition and modern literature; traditional philosophies and religions. The roles of Islam and Christianity in Africa. (Fall)

8 **Islamic Humanities** (3) Khoury
Facets of Islamic civilization, including the defining features of the Islamic tradition and the history within which it has unfolded. The diversity within the Islamic community is considered, especially in its encounter with modernity. (Spring)

11–12 **Roots of the Western Tradition** (3–3) Ganz, Ticktin
A two-semester, in-depth expansion upon the content of Hmn 1. For students in the "Roots" Residential Program only. Hmn 11 is taken in conjunction with Engl 13; Hmn 12, with Engl 100. (Academic year)

INTERNATIONAL AFFAIRS

University Professor J.N. Rosenau
Professors W.H. Becker, E. Berkowitz, B.L. Boulier, M.D. Bradley, J. Chaves, J.J. Cordes, R.M. Dunn, Jr., M.A. East, F. Ghadar, D. Gow, H. Harding, J. Henig, M.A. Holman, R.E. Kennedy, Jr., Y. Kim, Y.K. Kim-Renaud, P.F. Klarén, R.M. Krulfeld, J.E. Kwoka, Jr., P. Lauter, C.A. Linden, J.M. Logsdon, J.C. Lowe, G. Ludlow, J. Manheim, C. McClintock, C. Menges (*Practice*), J. Millar, H.R. Nau, R.D.F. Palmer (*Practice*), J. Pelzman, I.M. Post (*Practice*), P. Reddaway, B. Reich, L.P. Ribuffo, H.M. Sachar, D. Shambaugh, S.C. Smith, M. Sodaro, R.H. Spector, R. Steinhardt, J.F. Thibault, R. Thornton, M. Whyte, S. Wolchik, A.M. Yezer
Adjunct Professors T.F. Carroll, J. Hardt
Associate Professors H.L. Agnew, C.J. Allen, M.A. Atkin, A. Bowie, N.J. Brown, C.J. Deering, C.F. Elliott, H.B. Feigenbaum, R. Grinker, C.J. Herber, D. Khoury, J. Kuipers, J.H. Lebovic, D.L. Lee, S. Livingston, E.A. McCord, B.D. Miller, M.O. Moore, Y. Olkhovsky, M. Price, R. Robin, F. Robles, R. Rodriguez-Garcia, R.W. Rycroft, S. Suranovic, N.S. Vonortas, G.C.Y. Wang

Assistant Professors D. Avant, D. Auerswald, B.J. Dickson, M. Finnemore, J. Goldgeier, D. Hart, J. Hershberg, S. Jain, S. McHale, S. Reeves, S. Rehman, P. Rollberg, S. Sell, L. Wilnat, L. Xue, D. Yang, A.Y. Zhao

The Elliott School of International Affairs offers a multidisciplinary program leading to the degree of Bachelor of Arts in the field of international affairs. The program provides students with a broad background in the general areas of international affairs as well as a solid liberal arts education focusing on an understanding of major historical and contemporary issues in international affairs.

Bachelor of Arts with a major in international affairs—The following requirements must be fulfilled.

1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Common Curriculum Requirements.
3. Required courses for the major—Econ 181–82; a foreign language through the third-year level; one course selected from Geog 110, 120, 124, 125, 127, 132, 133, 134, 135, 136, 137, 141, 143, 145, 146, 147, 154, 161, 164; Hist 182 and one course selected from Hist 136, 157; one course selected from PSc 139, 140, 142, 144. Also required are two non-Western cultural courses; consult program guidelines, available in the Elliott School. Students must take a research methods course to be chosen from among PSc 101 or 104, Soc 101; Stat 51, 53, 111, or 112.
4. Group Concentration—15 credit hours of additional course work in one of the following areas: international politics, international economics, and regional studies. Regional studies include Western Europe, East Asia, Latin America, Africa, Middle East, and Russia and Eastern Europe. Please consult program guidelines, available in the Elliott School, for courses in the selected group concentration.

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of their program. With permission, a limited number of graduate courses may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

The following courses carry the International Affairs (IAff) designation. All other courses listed above will be found under the appropriate department designation.

Note: International affairs courses numbered in the 90s may be cross-listed by other departments, often under Special Topics courses; see the *Schedule of Classes*.

5 Introduction to International Affairs: A Washington Perspective (4) — Staff
A required course for Elliott School freshmen. IAff 5 covers the same academic content as PSc 3, while additionally integrating material designed to orient students to the University, the city of Washington, and the study of international affairs. Same as PSc 5. (Fall and spring)

90 Latin America: Problems and Promise (3) — Klarén and Associated Faculty
An interdisciplinary course in Latin American studies designed to introduce undergraduates to the diverse, rich, and complex history, politics, economy, culture, and society of Latin America. (Fall)

91 East Asia—Past and Present (3) — Staff
An interdisciplinary course offering a comprehensive and integrated introduction to the civilization and present problems of East Asia. (Spring)

92 Russia and Eastern Europe: An Introduction (3) — Reddaway and Associated Faculty
A multidisciplinary introduction to the lands and cultures of the former Soviet Union and Central and Eastern Europe. The main emphasis is on history and politics, with attention also given to economics, trade, geography, military matters, literature, and the media. (Fall)

93 Africa: Problems and Prospects (3) — Staff
Aspects of the environment, culture, and politics as they affect the present and anticipated future of Africa. (Spring)

190 Special Topics (3) — Staff
Courses designed to focus on international affairs issues of a more current or topical nature. Topics announced in the *Schedule of Classes*. May be repeated for credit.

195 **Internship** (0 to 6) Staff
Internships in public, private, and nonprofit organizations concerned with international affairs. Admission by permission of instructor and Elliott School Office of Student Services.

198 **Independent Study and Research** (1 to 3) Staff
For upper-division students only. Written permission of instructor required. May be repeated for credit with permission of the dean.

INTERNATIONAL BUSINESS

Professors G.P. Lauter (*Chair*), Y.S. Park, H.G. Askari
Professorial Lecturers D.A. Peterson, N. Bruck, R. Scaldini
Associate Professors F. Robles, R. Weiner
Assistant Professors M.L. Egan, S.S. Rehman, D.M. Sanford, Jr., J. Yang, H.J. Teegen, R.W. Click, L.B. Schumacher

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration.

160 **Introduction to International Business** (3) Sanford, Yang
Social, cultural, political, legal, and technological environment of multinational business, emphasizing host-government/multinational corporation interface. Terminology, trade uses and practices, conditions essential for successful business operations; physical movement of goods in international business. Prerequisite: Econ 11–12. (Spring)

166 **International Marketing Management** (3) Robles, Egan
Scope of international markets; factors in assessing world marketing opportunities; international marketing product, pricing, distribution, and promotion program development in dynamic world markets and global environment. Prerequisite: BAdm 110. (Fall and spring)

168 **Foreign Market Analysis** (3) Robles, Teegen
Project course involving global market research for target market selection, market entry strategy and in-country marketing plan development and financial implications of recommended global marketing strategy. Focus on consulting process as ancillary component. Prerequisite: IBus 160, 166. (Spring)

171 **International Business Finance** (3) Rehman, Yang, Click, Schumacher
Analysis of the international economic environment and its influence on corporate financial management of international operations. Prerequisite: BAdm 115. (Fall and spring)

173 **International Banking** (3) Rehman, Schumacher
Theory and practice of international banking, analysis of international commercial and investment banking from a management perspective; subjects include current international monetary and financial environment, money and capital markets, and topical problems of international banking from a management perspective. Prerequisite: IBus 171. (Fall and spring)

175 **International Monetary and Financial Issues** (3) Rehman, Yang
International macro and micro issues of money, banking, and finance examined from a management perspective. Topics include international monetary systems, Eurocurrency markets, LDC debt crises, role of the IMF and the World Bank, and development banking issues. Prerequisite: IBus 171 or permission of instructor. (Fall)

190 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods.

199 **Independent Study** (arr.)
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

ITALIAN

See **Romance Languages and Literatures.**

JAPANESE

See **East Asian Languages and Literatures.**

JOURNALISM

See **Media and Public Affairs.**

JUDAIC STUDIES

Committee on Judaic Studies
M.E. Saperstein (*Chair*), P. Duff, R. Eisen, Y. Moses, J.A. Plotz, B. Reich, H.M. Sachar, M. Ticktin

Columbian School of Arts and Sciences offers an interdisciplinary program in Judaic studies leading to the degree of Bachelor of Arts. This program is intended for students who wish to investigate the history, language, literature, religious and philosophical thought, and political and social experience of the Jewish people from the perspective of several academic disciplines. (Students who wish to concentrate on the religious aspects of Judaism and its relationship to the other religious traditions of the world may prefer to elect a major in religion with an emphasis on Judaism [see Religion].)

Bachelor of Arts with a major in Judaic studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Hebr 1–2, 3–4; Rel 9, 23.
3. Required courses for the major (27 credit hours):

(a) Hebr 103 and 104 or 106; Hist 158; PSc 176 or 179; Rel 107 and one course chosen from Rel 209, 213, 238.

(b) Three courses selected from the list below; substitutions are permitted with the approval of an advisor designated by the Committee on Judaic Studies.

Minor in Judaic studies—Required: Hebr 1–2 and a minimum of 12 credit hours, chosen in consultation with an advisor designated by the Committee on Judaic Studies, from the courses listed below.

See the Graduate Programs Bulletin for courses at the 200 level.

Clas 100	*Modern Hebrew Literary Classics*
Clas 101	*Israeli Society and Culture: Literary Perspectives*
Clas 185–86	*Directed Reading*
Hebr 1–2	*Beginning Hebrew*
Hebr 3–4	*Intermediate Hebrew*
Hebr 103	*Modern Hebrew Nonfiction*
Hebr 104	*Modern Hebrew Fiction*
Hebr 106	*The Israeli Media*
Hebr 120–21	*Advanced Hebrew Literature*
Ydsh 1–2	*Yiddish for Reading and Conversation*
Hist 158	*Modern Jewish History*
Hist 292	*Israel, Zionism, and the Arab World*
PSc 176	*The Arab–Israeli Conflict*
PSc 179	*Israeli Politics and Foreign Policy*
Rel 9	*Bible: Hebrew Scriptures*
Rel 23	*Introduction to Judaism*
Rel 103	*The Prophets*
Rel 107	*Rabbinic Thought and Literature*
Rel 112	*Jewish Mysticism*
Rel 113	*Early Post-Biblical Judaism*
Rel 115	*Jewish Philosophy in the Medieval Period*
Rel 116	*Modern Jewish Thought*
Rel 123	*Issues in Jewish Ethics*
Rel 134	*The Holocaust in Theology and Literature*
Rel 174	*American Judaism*
Rel 209	*Seminar: Biblical Studies*
Rel 213	*Seminar: Judaism in Late Antiquity*
Rel 238	*Seminar: Topics in Jewish Thought*

KOREAN

See **East Asian Languages and Literatures.**

LATIN

See **Classics.**

LATIN AMERICAN STUDIES

Program Committee: C. McClintock (*Director*), C.J. Allen, P.F. Klarén, M. Price, J. Quiroga

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in Latin American studies.

Bachelor of Arts with a major in Latin American studies—The following requirements must be fulfilled.

1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Common Curriculum Requirements.
3. Required courses for the major—one course chosen from Anth 170, 172, 185, 186, or 192; Econ 185; Geog 161; Hist 163–64; IAff 90, 287; PSc 183, 184; one course in Spanish-American literature chosen from Span 55, 56, or 133; one course chosen from Anth 200; PSc 101, 104; Soc 101; Stat 51, 111, 112.
4. Twelve credit hours of related course work must be taken in anthropology, art history, economics, geography and regional science, history, international affairs, political science, and Hispanic literature.

Students should consult the program guidelines available from the Elliott School for courses pertinent to Latin American studies. Students should consult the program director concerning certain Special Topics or Selected Topics courses that may also be part of this program.

LIBERAL ARTS

Advisor R.P. Churchill

Bachelor of Arts: Program in the Liberal Arts—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. *Writing*—6 credit hours selected from Engl 9 or 10, 11 or 13, 101, 111, and/or creative writing courses.
3. *Quantitative and/or Logical Reasoning*—at least 6 credit hours, chosen from the combinations of courses specified under this General Curriculum requirement or from more advanced mathematics or statistics courses if prerequisites have been met.
4. *Conceptual Foundations and Development of Natural Sciences*—12–16 credit hours (two 6–8 hour sequences), chosen from the combinations of courses specified under this General Curriculum requirement. One sequence must be in Group A (biology or geology) and one in Group B (astronomy, chemistry, or physics).
5. *Social and Behavioral Sciences*—12 credit hours are required; 6 hours of paired course sequences (as indicated) must be chosen from each of the following two groups:
   (a) Econ 11–12 or PSc 1 and 2 or 3–4;
   (b) Two courses chosen from Anth 2, 3, and 4; Anth 2 and 150; Geog 1 and 2; Psyc 1 and 12; Soc 1 and 3.
6. *The Arts*—6 credit hours, of which 3 hours must be chosen from courses specified under the General Curriculum requirement in Creative and Performing Arts. Three additional hours must be chosen from the following: any art history course (except Art 119, 162, and 173 through 198); Comm 160, 170; Mus 3, 4, 7, 8, 101–2, 103–4, 109, 110, 121; or TrDa 45, 46, 145–46, 190, 191. Engl 81 may count toward either this requirement or the Writing requirement but not both.
7. *Literature*—12 credit hours, of which 6 hours must be chosen from the combinations of courses specified under the General Curriculum requirement. Six additional hours must be chosen from literature courses offered by the Classics, East Asian Languages and Literatures, English, Romance Languages and Literatures, or German and Slavic Languages and Literatures Departments, or offered through the Honors program

8. *Western Society and Civilization*—12 credit hours are required; 6 hours of paired course sequences (as indicated) must be chosen from each of the following two groups:

(a) Hist 39–40 or 71–72; if those courses have been waived, second-group courses in the History Department (except Hist 191–92 and 197) may be selected;

(b) AmSt 71–72; Art 31–32; Clas 71–72; Honr 71–72; Hmn 1, 2; Hmn 4, 5; Phil 51–52; Rel 1, 2. Art 31–32 may count toward either the Arts or the Western Society and Civilization requirement, but not both.

9. *Foreign Language*—6 credit hours in a foreign language beyond the second-year sequence.

10. A minimum of 36 credit hours must be taken in approved 100-level liberal arts courses (with a grade of *C*− or better).

Because this program allows considerable flexibility, a student should consult the advisor frequently to ensure that requirements are being addressed and that the planned program best meets the student's evolving interests and needs. The major in Liberal Arts may be combined with a second major. See Interdisciplinary Programs under Columbian School of Arts and Sciences for a general description of this program.

LINGUISTICS

Committee on Linguistics
B. Tyndall (*Chair*), L. Bland, G.R. Bozzini, J.K. Donaldson, S. Hamano, Y.-K. Kim-Renaud, J. Kuipers, R.M. Robin

Columbian School of Arts and Sciences offers an interdepartmental program in linguistics. The purpose of the program is to provide a systematic treatment of the central issues in linguistics through courses taught under the auspices of the program and through other departments in Columbian College.

Minor in linguistics—15 credit hours of courses in linguistics, including Ling 101 and one course from each of the following groups. Applied Linguistics—Chin 123–24; SpHr 130, 131. Biological Foundations of Language—SpHr 102, 103. Sociolinguistics—Anth 161, 162; Phil 214 (with permission of instructor). Academic advising about the minor in linguistics is available from any member of the Committee on Linguistics.

101 Language and Linguistic Analysis (3) Tyndall and Staff
Development of a fundamental understanding of the nature of language and its components, including phonology, morphology, syntax, semantics, and pragmatics. Discussion of major approaches, principles, and concerns in the field of linguistics. Same as Anth 168. (Spring)

MANAGEMENT SCIENCE

Professors J.B. Harvey, W.E. Halal, E.H. Forman, S.A. Umpleby, J.F. Lobuts, Jr., J.D. Frame, E.K. Winslow (*Chair*), J.H. Carson, P.W. Wirtz, J. Liebowitz, E.J. Cherian, S.N. Sherman, J.H. Perry, P.K. Bagchi, J.P. Coyne, R. Soyer
Professorial Lecturers E. Marits, G.T. Solomon, J.L. Wild
Associate Professors L.E. Graff, T.J. Nagy, R.G. Donnelly, C.N. Toftoy, P.M. Swiercz, D.I. Cohen, P.P. Sanchez, D.L. Zalkind, W.H. Money, M.J. Granger, J. Artz
Adjunct Associate Professors L. Williams, C.K. Carlson
Associate Professorial Lecturer C.A. Gruel
Assistant Professors Z. Covaliu, S.Y. Prasad, L.M. Birou, K. McManus (*Visiting*), P. McHugh, E.G. Carayannis, C. Goldberg (*Visiting*), S. Sarker
Adjunct Assistant Professor S. Lippert
Adjunct Instructor X.Y. Dai

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration.

107 Fundamentals of Behavioral Science (3) Lobuts, Winslow
Survey of behavioral science research and practice as related to management. Emphasis on the basic human processes that contribute to the functioning of organizations. (Fall and spring)

110 Applied Human Resource Management (3) Cohen, McHugh, Swiercz
The labor force and labor markets. The legal environment of human resource management. Human resource planning; employee recruiting, selection, train

ing, development, compensation, motivation, discipline, health and safety. Prerequisite: BAdm 130.

115 **Leadership** (3) Malone, Cohen
Examination of theories and contemporary trends relating to leadership, organizational behavior, and the management of human resources. Experiential exercises designed to enhance interpersonal skills and leadership abilities. Prerequisite: BAdm 130. (Fall)

117 **Labor Relations, Negotiation, and Conflict Resolution** (3) McHugh
Introduction to labor–management relations. Labor law; economic, social, and public policy implications of collective bargaining; negotiation and conflict resolution in union and non-union workplaces. Prerequisite: BAdm 130. (Spring)

118 **Principles of Information Technology** (3) Granger, Lippert
The impact of information technology on the business organization. Analysis, design, development, implementation, maintenance, and control of information technology. Emerging information technologies, such as telecommunications and multimedia. Prerequisite: BAdm 54. (Fall)

119 **Introduction to Structured Programming** (3) Sarker, Lippert, Artz
For students already familiar with basic computer concepts, who will learn a programming language, such as C, Pascal, or COBOL, useful for business applications. Emphasis on computer applications in accounting and management information systems through hands-on programming. Prerequisite: BAdm 54. (Fall and spring)

120 **Structured Development with CASE** (3) Granger, Sarker
Analysis, design, and implementation of management information systems (MIS). Structured methodologies and techniques for various stages of the MIS development process. Computer-aided software engineering tools. May be taken for graduate credit with permission of program director and instructor. Prerequisite: Mgt 119 or permission of instructor. (Fall and spring)

121 **Database Design and Applications** (3) Granger, Sarker
Theory, architecture, and implementation of database management systems in corporate and organization information systems. Fundamental concepts of database management and processing. Expert database systems. Hands-on experience with database management packages. Prerequisite: Mgt 119 or permission of instructor. (Fall and spring)

122 **Applied Artificial Intelligence** (3) Liebowitz
Students use artificial intelligence software to learn knowledge representation and manipulation of knowledge and to develop business systems. Prerequisite: Mgt 119 or permission of instructor. (Spring)

190 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods. May be repeated once for credit.

192 **Small-Business Management** (3) Toftoy
Theory and practice of small-business management. Focus on effective management of small firms, essentials of planning and organizing the firm, financial and administrative controls. Evaluation of alternative business forms, purchase of an ongoing firm, franchising, and new business start-ups. (Fall)

199 **Independent Study** (3) Staff
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall, spring, and summer)

MARKETING

Professors S.F. Divita, R.F. Dyer, P.A. Rau (*Chair*), R.S. Achrol
Associate Professors M.L. Liebrenz-Himes, L.M. Maddox, S.S. Hassan
Assistant Professor A.K. Smith
Adjunct Assistant Professor C.B. Iacobina

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration

Departmental prerequisite: BAdm 110 is prerequisite to all courses in the Marketing Department.

142 **Consumer Behavior** (3) Dyer, Hassan
Social, cultural, and psychological factors influencing the behavior of consumers. Models of buyer behavior, consumption patterns, market segmentation, attitude formation and change, brand loyalty, adoption of innovations, and store choice decisions. Marketing management and public policy implications of consumer research. (Fall and spring)

143 **Marketing Research** (3) Dyer, Rau
Basic methods and techniques of market research. Designing a marketing research project: research questions, secondary and syndicated data, primary data collection approaches, data analysis and report presentation. Focus group interviews, questionnaire construction, statistical software packages. Prerequisite: BAdm 54, Stat 51. (Fall and spring)

148 **Advertising** (3) Maddox
Planning an advertising campaign. Consumer and market information, message appeals, media selection and scheduling, measuring effectiveness. Current criticism and regulation of the advertising function. Other major marketing communication tools, including personal selling and sales promotion. Prerequisite: Mktg 142. (Fall and spring)

149 **Advanced Advertising Campaigns** (3) Maddox
Participation in the National Student Advertising Competition. Research, media planning, copywriting, layout/design. Travel to competition site. Prerequisite: BAdm 110 and permission of instructor; concurrent registration: Mktg 199. (Spring)

150 **Salesmanship and Sales Management** (3) Staff
Development of personal selling and presentation skills; examination of types of selling situations. Organization of sales department, sales planning and forecasting, quotas, territories, performance standards, and analysis and control of distribution costs. (Fall and spring)

152 **Retailing Management** (3) Staff
A study of retailing management and strategy covering the current environment of retailing, retail market and financial analysis, store location and design, inventory management, and non-store and service retailing. Industry executive and student presentations and case analyses. (Fall)

159 **Marketing: Strategic Planning** (3) Dyer, Liebrenz-Himes, Rau, Jacobina
The capstone seminar for marketing majors. Analytical integration of material covered in previous marketing courses. Marketing strategy literature, financial dimensions of marketing decisions, and comprehensive cases. Prerequisite: Mktg 142, 143, 150, and one additional marketing major field course. (Fall and spring)

190 **Special Topics** (3) Staff
Experimental offering: new course topics and teaching methods.

199 **Independent Study** (arr.)
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

MATHEMATICS

Professors I. Katz, H.D. Junghenn (*Chair*), I.I. Glick, M.M. Gupta, R. Simion
Associate Professors M.P. Lee, E.A. Robinson, F.E. Baginski, D.H. Ullman, V. Harizanov, K.G. Hockett, M. Moses, J. Bonin, J. Przytycki
Assistant Professors N. Taghavi, Y. Rong

Bachelor of Arts or Bachelor of Science with a major in mathematics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. **Prerequisite courses—Math 21 or 31, and Math 32, 33, and 124.**
3. Required courses in the major—a minimum of 24 additional credit hours of approved 100-level courses in mathematics, including Math 106, 121, 125, 139, and 142. It is recommended that students take French, German, or Russian, and additional courses in related areas such as statistics, computer science, physics, chemistry, biology, economics, applied science, and operations research.
4. Undergraduates who want special honors status should contact a department advisor.

Bachelor of Arts or Bachelor of Science with a major in applied mathematics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Math 21 or 31, and Math 32, 33, and 124.
3. Required courses in the major—a minimum of 24 additional credit hours of approved 100-level courses in mathematics, including Math 111, 112, 139, 140, and 181. It is recommended that students take French, German, or Russian.
4. Required courses in a related area—12 additional credit hours, to be selected in consultation with a departmental advisor, from a related area such as statistics, computer science, physics, engineering, chemistry, biology, economics, applied science, and operations research. At least 6 of these hours must be chosen from courses numbered 101 or higher.
5. Undergraduates who want special honors status should contact a departmental advisor.

Minor in mathematics—Requirements, a minimum of 18 credit hours in mathematics courses, of which at least 12 hours must be at the 100 level or higher, chosen in consultation with a departmental advisor.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: Some courses require a placement examination in lieu of a course prerequisite. This examination is offered by arrangement with the Department of Mathematics.

3 College Algebra (3) Staff
Equations and inequalities, functions and graphs, polynomial and rational functions. Exponential and logarithmic functions. Systems of equations. Prerequisite: the placement examination.

5 Trigonometry (3) Staff
Right triangles, trigonometric functions and their graphs. Trigonometric identities. Polar coordinates. Prerequisite: Math 3 or the placement examination.

9 Mathematical Ideas I (3) Staff
Prime numbers, the fundamental theorem of arithmetic, rational and irrational numbers. Infinite sets and cardinal numbers.

10 Mathematical Ideas II (3) Staff
Axiom systems, probability, elementary graph theory, map coloring, Euler's formula.

20–21 Calculus with Precalculus I–II (3–3) Staff
An introduction to single-variable calculus (differentiation and integration of algebraic and trigonometric functions with applications), with the concepts and techniques of precalculus developed as needed. Prerequisite to Math 20: the placement examination or a score of 540 or above on the Mathematics Achievement Test; Math 20 is prerequisite to Math 21. Credit cannot be earned for both Math 21 and 31.

30 Precalculus (3) Staff
Equations, inequalities, and functions. Properties of polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: the placement examination or a score of 540 or above on the Mathematics Achievement Test.

31 Single-Variable Calculus I (3) Staff
Limits and continuity. Differentiation and integration of algebraic and trigonometric functions with applications. Prerequisite: Math 6 or 30, or the placement examination, or a score of 700 or above on the Mathematics Achievement Test.

32 Single-Variable Calculus II (3) Staff
The calculus of exponential and logarithmic functions. L'Hopital's rule. Techniques of integration. Infinite series and Taylor series. Polar coordinates. Prerequisite: Math 21 or 31.

33 Multivariable Calculus (3) Staff
Partial derivatives and multiple integrals. Vector-valued functions. Topics in vector calculus, including 3-dimensional vectors, line and surface integrals, and the theorems of Gauss, Green, and Stokes. Prerequisite: Math 32.

51 **Finite Mathematics for the Social and Management Sciences** (3) Staff
Systems of linear equations, matrix algebra, linear programming, probability theory, and mathematics of finance. Prerequisite: Math 3 or the placement examination or a score of 540 or above on the Mathematics Achievement Test.

52 **Calculus for the Social and Management Sciences** (3) Staff
Differential and integral calculus of functions of one variable; applications to business and economics. Prerequisite: Math 3 or the placement examination or a score of 540 or above on the Mathematics Achievement Test.

101 **Introduction to Mathematical Logic** (3) Harizanov, Moses
Symbolic logic as a precise formalization of deductive thought. Logical correctness of reasoning. Formal languages, interpretations, and truth. Propositional logic and first-order quantifier logic suited to deductions encountered in mathematics. Prerequisite: Math 32 or permission of instructor.

102 **Axiomatic Set Theory** (3) Harizanov, Moses
Cantor's theory of sets. Russell's paradox. Axiomatization of set theory as a framework for a contradiction-free mathematics. Finite, countable, and uncountable sets; ordinal and cardinal numbers; the axiom of choice. Prerequisite: Math 101 or permission of instructor.

103 **Computability Theory** (3) Harizanov, Moses
The unlimited register machine as a model of an idealized computer. Computable functions, Church's thesis. Effective enumerability. Unsolvability of the halting problem and other theoretical limitations on what computers can do. Prerequisite: Math 32 or permission of instructor.

106 **Introduction to Topology** (3) Przytycki, Rong
Metric spaces: completeness, compactness, continuity. Topological spaces: continuity, bases, subbases, separation axioms, compactness, local compactness, connectedness, product and quotient spaces. Prerequisite: Math 139 or permission of instructor.

107 **Introduction to Algebraic Topology** (3) Przytycki, Rong
The fundamental group, covering spaces, simplicial homology, and the Euler characteristic. Topics may include surfaces, knot theory, and the Jordan curve theorem. Prerequisite: Math 106 and 121 or permission of instructor.

111 **Introduction to Differential Equations and Applied Mathematics I** (3) Staff
Analytical methods for the solution of problems in engineering, the physical sciences, and applied mathematics: applications of ordinary differential equations, matrices and determinants, eigenvalues and eigenvectors, systems of ordinary linear differential equations, Bessel and Legendre functions. Prerequisite or concurrent registration: Math 33.

112 **Introduction to Differential Equations and Applied Mathematics II** (3) Staff
Analytical methods for the solution of problems in engineering, the physical sciences, and applied mathematics: complex variables, Fourier series and integral, frequency filters, Laplace transforms, inversion and Duhamel integrals, partial differential equations. Prerequisite: Math 111 or ApSc 113.

113 **Introduction to Combinatorics** (3) Bonin, Simion, Ullman
Introduction to combinatorial enumeration and partially ordered sets. Basic counting techniques, inclusion–exclusion principle, recurrence relations, generating functions, pigeonhole principle, bijective correspondences, and applications to computer science. Prerequisite: Math 32.

120 **Elementary Number Theory** (3) Bonin, Katz
Divisibility of integers, prime numbers, greatest common divisor, the Euclidean algorithm, congruence, the Chinese remainder theorem, number theoretic functions, Mobius inversion, Euler's Phi function, primitive roots and indices, applications to cryptography, and primality testing. Prerequisite: the placement examination.

121 **Introduction to Abstract Algebra** (3) Katz, Lee
The concept of a group, subgroups, Lagrange's theorem, normal subgroups, homomorphisms, Cayley's theorem, abelian groups, applications to counting problems, cryptosystems, integer programming, crystallographic groups. Prerequisite: Math 32 and 124 or permission of instructor.

122 **Introduction to Abstract Algebra II** (3) Katz, Lee
The concept of a ring, polynomial rings, subrings, ideals, quotient rings, unique factorization, fields, field extensions, splitting fields, geometric problems, Galois theory, block designs, error-correcting codes. Prerequisite: Math 121.

124 **Introduction to Matrix Theory** (3) **Katz and Staff**
Linear equations, matrices, inverses, and determinants. Vector spaces, rank, eigenvalues, diagonalization, and quadratic forms. Applications to geometry and ordinary differential equations. Prerequisite: Math 21 or 31, or 51 and 52, or permission of instructor.

125 **Linear Algebra** (3) **Katz, Lee**
Theory of vector spaces, linear transformations, and matrices. Quadratic and bilinear forms, spectral decomposition, similarity. Prerequisite: Math 124.

132 **Introduction to Discrete Structures** (3) Bonin, Simion, Ullman
Discrete structures and associated mathematical tools. Topics include sets, functions, relations, directed and undirected graphs, principles of counting, Boolean algebras, with applications to computer science. Same as Stat 132. Prerequisite: Math 21 or 31 and Stat 130.

135 **Projective Geometry** (3) **Bonin, Katz**
Projective spaces, projectivities, conics, pairs and pencils of conics, finite planes, coordinates, collineation, Desarguesian planes. Prerequisite: Math 120 or 121 or permission of the instructor.

139 **Advanced Calculus I** (3) **Hockett, Junghenn, Ullman**
A rigorous study of differentiation, integration, and convergence. Topics include sequences and series, continuity and differentiability of real-valued functions of a real variable, the Riemann integral, sequences of functions, and power series. Prerequisite: Math 33 or equivalent.

140 **Advanced Calculus II** (3) **Hockett, Junghenn, Ullman**
Continuation of Math 139. Topics include: topology of R^n, derivatives of functions of several variables, inverse function theorem, implicit function theorem, multiple integrals, Stokes's theorem. Prerequisite: Math 124 and 139.

142 **Ordinary Differential Equations** (3) Glick, Hockett
Linear and some nonlinear differential equations. Topics include existence and uniqueness theorems, stability, control theory, limit cycles, and applications to physics and ecology. Prerequisite: Math 33 and 124.

143 **Partial Differential Equations** (3) Gupta
The solution of linear PDEs, Green's functions, separation of variables, Fourier analysis, Sturm–Liouville theory and methods. Prerequisite: Math 112 and 124, or Math 139, or permission of instructor.

148 **Differential Geometry** (3) Baginski
Curves in space, regular surfaces, tensors, fundamental forms of a surface, Gauss–Bonnet theory, minimal surfaces. The geometry of the Gauss map. Prerequisite: Math 140 or permission of instructor.

153 **Introduction to Numerical Analysis** (3) Gupta
Accuracy and precision. Linear systems and matrices. Direct and iterative methods for solution of linear equations. Sparse matrices. Solution of nonlinear equations. Interpolation and approximate representation of functions, splines. Prerequisite: Math 33 or 124 or equivalent and some knowledge of computer programming.

157 **Introduction to Complex Variables** (3) Junghenn
Analytic functions and power series. Contour integration and the calculus of residues. Conformal mapping. Physical applications. Prerequisite: Math 139 or permission of instructor.

170 **Computational Complexity** (3) Harizanov, Moses
Deterministic and nondeterministic Turing machines. Partial recursive functions and the Church–Turing thesis. Undecidable problems. Space and time complexity measures. Gap, speed-up, and union theorems. Decidable but intractable problems. The traveling salesman problem and other NP-complete problems. Prerequisite: Math 32 or permission of instructor.

181 **Seminar: Applied Mathematics** (3) Glick
Each offering of this course focuses on a particular aspect of applied mathematics. Past topics have included: fractals; network flows and combinatorial optimization; linear programming, automata theory and the theory of computation; information theory and coding theory; dynamical systems; queuing theory. Prerequisite: Math 124 and 139 or permission of instructor.

191 **Special Topics** (arr.)
Admission by permission of instructor. May be repeated for credit.

195 **Reading and Research** (arr.)
Under the personal direction of an instructor. Limited to mathematics and applied mathematics majors with demonstrated capability. Prior approval of instructor required. May be repeated for credit.

MECHANICAL ENGINEERING

See **Civil, Mechanical, and Environmental Engineering.**

MEDIA AND PUBLIC AFFAIRS

Professors C.H. Sterling, J.B. Manheim, J.L. Folkerts (*Director*), C. Stern, S.V. Roberts
Professorial Lecturer L.B. Laurent
Associate Professors J.E. Thiel, J.E. Steele, S.L. Livingston, L.S. Harvey
Associate Professorial Lecturers J.R. Fogarty, D.L. Smith, J.A. Echave, C. Flintoff, L.C. Francis, M.C. McAllister, A. Crowe
Assistant Professors S. Keller, L. Willnat
Adjunct Assistant Professors M.M. Travis, D. Havinga
Assistant Professorial Lecturer M.C. Sheward

Through the Columbian School of Arts and Sciences, the School of Media and Public Affairs offers programs of study leading to the Bachelor of Arts in the fields of journalism, political communication, and electronic media. Students must be admitted to degree programs within the School of Media and Public Affairs by separate application. Requirements for admission include the completion of specific prerequisites for each program and a minimum GPA of 2.7. Application to the majors usually is made during the sophomore year. Programs are listed below with their course offerings.

All students enrolled in majors offered by the School of Media and Public Affairs must take the three courses listed here. SMPA 50 is prerequisite to all majors, and SMPA 51 and 199 are required for all majors.

SCHOOL OF MEDIA AND PUBLIC AFFAIRS

50 **Introduction to Media and Public Affairs** (3) — Folkerts, Harvey, Keller, Livingston, Steele
The historical and philosophical origins of contemporary communication, both as a significant aspect of public and private life and as a field of inquiry; the principal approaches to studying communication and the role of communication in the contemporary era.

51 **Research Methods** (3) — Folkerts, Harvey, Livingston, Manheim, Willnat
Processes of inquiry within interpersonal and mediated communication. Students are introduced to concepts of framing research questions, conducting literature reviews, developing a research design, and interpreting results of cultural and social science research within a societal framework.

190 **Selected Topics** (3) — Staff
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

199 **Senior Seminar** (3) — Manheim, Sterling, Thiel, Folkerts, Livingston
Capstone course limited to SMPA program majors. Selected reading and discussion with possible fieldwork. Students should consult program director regarding additional restrictions on enrollment.

JOURNALISM

Bachelor of Arts with a major in journalism—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. **Prerequisite courses—Engl 51–52 or 71–72; PSc 2 and either 1 or 3; Stat 51 or 53; Jour 100; SMPA 50.**
3. **Required courses in SMPA: SMPA 51 and 199.**
4. Required courses in the major: 21 hours of 100-level courses, including Jour 111, which must be completed with a grade of *B-* or better, and Jour 198, 9 credit hours chosen from Jour 121, 125, 133, 137, 138, 139, 151, 155; and 6 credit hours chosen from Jour 101, 115, 116, 117, 118, 128, 129, 140, 145, 146, 147, 150, 170, 197 (only 3 credits apply to 197).

5. Required courses in related areas: 18 credit hours of 100-level courses in one other department, program, or field of study, as approved by the major advisor.
6. A minimum of 69 credit hours in courses outside SMPA and its programs.
7. Recommended electives: AmSt 71–72; Anth 4; Art 23; Econ 121, 142, 157; Hist 71–72; Phil 45, 121; PSc 110 through 124; Psyc 115; EMda 100, 142, 144, 145; Stat 105, 129.

Minor in journalism—21 credit hours of journalism courses, including Jour 100, 111; one course chosen from Jour 115, 116, 117, 170; three courses chosen from Jour 121, 125, 133, 137, 138, 139, 147, 151, 155; and any other journalism course.

Special Honors—Senior journalism majors with a grade-point average of 3.5 in a minimum of five journalism courses (excluding Jour 100) may apply for Special Honors at the start of the senior year with submitted proof of ability in professional media work. They then must complete degree requirements with a 3.0 or better GPA in all courses and a 3.5 GPA or better in journalism courses. Four weeks before the end of the final semester, candidates must submit published or broadcast journalism work completed during the senior year.

Note: Jour 111 and program approval are prerequisite to Jour 115, 125, 133, 137, 138, 139, 147, 151, 155.

100 **Mass Media and Society** (3) Folkerts, Steele
Overview of U.S. print press, radio, television, and film, with examination of political, economic, and legal structures. Media content and construction of news; some attention to news institutions and operations and press freedoms internationally. Prerequisite: SMPA 50 or program approval.

101 **U.S. Media History** (3) Folkerts, Steele
History of American media, starting with the Colonial period; political, social, and economic developments. Media relations with government; the evolving concept of freedom of the press. Recommended prerequisite: Hist 71–72.

111 **Reporting** (3) Crowe and Staff
Gathering information, evaluating it, and writing news and feature stories, with emphasis on print media. Historical, ethical, and legal perspectives of journalistic reporting. Campus and metro area assignments, with concentration on government and politics. Freshmen need departmental permission to enroll. Laboratory fee, $50.

115 **Newspaper Editing and Make-up** (3) McAllister
Emphasis on newspaper design, editing, and layout. Selecting and editing stories; writing headlines and photo captions; selecting, sizing, and cropping photos and other graphic materials; laying out pages. Ethics of editing.

116 **Magazine Layout and Design** (3) Smith
Layout, typography, and design for magazines, house organs, and similar publications for associations, institutions, and industry.

117 **Magazine Editing** (3) Staff
The editor's responsibility to publisher and readers. Setting editorial goals; planning content and production to meet them. Editing copy; working with art directors.

118 **Strategic Political Communication** (3) Manheim
Same as PCm 118.

121 **Feature and Free-lance Writing** (3) Folkerts, Roberts, and Staff
Selecting topics for investigation and reporting, writing and marketing articles. Permission of instructor required.

125 **Science Writing** (3) Staff
Writing science news and features for the mass media.

128 **Political Communication in Governance and Policymaking** (3) Staff
Same as PCm/PSc 128.

129 **Television and Politics** (3) Staff
Same as PCm/PSc/EMda 129.

133 **Advanced Reporting: Public Affairs** (3) Staff
Coverage and writing of local and state government news.

137 **Advanced Reporting: National Affairs** (3) Fogarty
Coverage and writing of federal government news.

138 **Advanced Reporting: Investigative** (3) Staff
In-depth reporting in selected areas of political, economic, and cultural affairs. Prerequisite: Jour 133 or permission of the program.

139 **Advanced Reporting: Broadcast News** (3) Stern
Preparing news and public affairs scripts and programs for broadcast.

140 **Photojournalism** (3) Echave
Elements of effective news and feature photos, including study and evaluation of slides taken by students. Picture selection, cropping, captions. Student costs include film and developing.

145 **Principles and Problems of Public Relations** (3) Staff
Principles, problems, ethics, and law of public relations for government, private concerns, educational and other public institutions.

146 **Government Information** (3) Staff
Aspects of information and public affairs functions of government agencies at all levels. Role of the information specialist. Writing and editing for government publications.

147 **Public Relations Cases and Techniques** (3) Staff
Study of selected public relations approaches in the public and private sectors, with emphasis on techniques employed to plan for and solve public relations communication problems. Prerequisite: Jour 111 and 145.

150 **News Coverage in Washington** (3) Staff
The Washington news beats, channels, and sources of news in the nation's capital; uses and abuses of the media; press conferences and briefings.

151 **Editorial and Persuasive Writing** (3) Staff
Techniques of editorial and column writing; editorial page and public affairs programming; function of commentary in a free press. Permission of instructor required.

155 **Critical Writing and Reviewing** (3) Laurent
Reviewing and commenting on the arts and entertainment for the mass media.

190 **Selected Topics** (3) Staff
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

196 **Independent Study** (1 to 6) Staff
The student pursues a program of directed reading, research, and writing under the direction of a faculty advisor. Limited to seniors. Permission of the program director required.

197 **Internship** (1 to 3) Staff
Study of a journalism organization in action through a semester of work in that office. Restricted to juniors and seniors majoring or minoring in journalism. Permission of the program director required. May be repeated for up to 9 credits.

198 **Law of the Press** (3) Stern
Freedom of the press, censorship, legislative controls, copyright, laws of libel and privacy, and business laws relating to the news business, privilege, and fair comment.

POLITICAL COMMUNICATION

Bachelor of Arts with a major in political communication—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses: SMPA 50; Jour 100; two courses selected from PSc 1, 2, or 3; Stat 53.
3. Required courses in SMPA: SMPA 51 and 199.
4. Required courses in the major: PCm 100; PSc 120; Jour 100, 111; and 18 hours of 100-level courses in political communication. The following courses may also satisfy this requirement: IAff 152; EMda 140, 175, 184. With permission of the program director, seniors with a grade-point average of 3.0 or better may apply one course in the Graduate School of Political Management toward this requirement.
5. Required courses in related areas: 6 additional credit hours of 100-level political science courses, and 6 additional credit hours of 100-level courses from any other program in the School of Media and Public Affairs.

Special Honors—Students with a grade-point average of 3.5 or better in all course work completed at George Washington University and in all courses required for the major may declare for Special Honors at the beginning of the senior year. Students declaring for Special Honors take PCm 196 in the first semester of the senior year and SMPA 199 in the second semester. To achieve Special Honors, the student must maintain the stated GPA

requirements and present a successful oral defense of a research paper prepared for the Senior Seminar before a committee that includes the program director and two other faculty members nominated by the student and approved by the program director.

100 **Introduction to Political Communication** (3) Manheim, Livingston, Willnat
Basic concepts and theories of political communication; development of a framework for analyzing political communication; applications in the United States, other countries, and the international system. Political communication majors have priority in registration. Prerequisite: SMPA 50.

115 **Political Campaign Communication** (3) Francis
Communication aspects of political campaigns for candidates and ballot issues. Examination of techniques and channels of communication, role of communication in campaign strategy, ethics and implications of campaign decision making.

118 **Strategic Political Communication** (3) Manheim
Origins of strategic approaches to political communication; techniques. Use of strategic communication by individuals, groups, organizations, and governments in both domestic politics and policymaking and in the international system. Prerequisite: PCm 100 or permission of the instructor.

128 **Political Communication in Governance and Policymaking** (3) Roberts
Exploration of the role played by communication, principally through the mass media, in the conduct of government and the making of public policy. Same as Jour/PSc 128.

129 **Television and Politics** (3)
Same as Jour/PSc/EMda 129.

140 **Media and Foreign Policy** (3) Livingston
Emerging role of news media in international affairs and diplomacy, particularly as it relates to U.S. foreign policy. Globalization of the news media, advances in instantaneous communications technologies, consequences for international diplomacy.

190 **Selected Topics** (3) Staff
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

196 **Independent Study** (1 to 6) Staff
The student pursues a program of directed reading or original research under the direction of a faculty advisor. Limited to seniors pursuing Special Honors in political communication. Before registering, the student must obtain approval of a written plan of study by the faculty member who will direct the study and by the program director.

197 **Field Experience** (3) Staff
Open to juniors and seniors majoring in political communication. Students spend at least 16 hours a week during the semester in an approved agency or office performing practical work in the subject under the general guidance of a faculty advisor. Grades are assigned on a Pass/No Pass basis only. May be repeated for credit once.

ELECTRONIC MEDIA

Bachelor of Arts with a major in electronic media—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses: SMPA 50; EMda 75, 100.
3. Required courses in SMPA: SMPA 51 and 199.
4. Required courses in the major: EMda 144, 145, and 18 additional hours of 100-level courses in electronic media, as approved by the major advisor, 9 of these hours must be in the 180–89 sequence.
5. Required courses in related areas: 15 credit hours of 100-level courses in one other department, program, or field of study, as approved by the major advisor.

Minor in electronic media—EMda 75 or 140 (taken first); and 15 additional credit hours, including EMda 100, one course in the 170–79 sequence, one course in the 180–89 sequence, and two additional electronic media courses numbered above 100.

Note: For EMda 75, 140, 142, 144, 145, and 146, attendance on the first meeting day of the class is required because equipment and scheduling instruction is provided that will not be repeated.

30 **Television's View of America** (3) Travis
The role of television entertainment and news programming in portraying the American people and interpreting their values and aspirations, their faults and frailties, their successes and failures, their heroes and villains. (Summer)

75 **Sight and Sound** (3) Thiel, Havinga
Development of a critical awareness of aural and visual communication through an introduction to the aesthetics, techniques, and organization of the creative process in electronic media. Lecture (2½ hours), laboratory (2 hours). Prerequisite: permission of instructor for nonmajors. Laboratory fee, $30. (Fall and spring)

100 **American Electronic Media** (3) Harvey
Study of the origins, structure, and nature of American broadcasting and related media.

129 **Television and Politics** (3) Staff
Same as Jour/PCm/PSc 129.

140 **Production for Non-Majors** (3) Havinga
Basic concepts of radio and television as communication media; emphasis on design and production techniques, with applications in political communication. Laboratory fee, $30. (Fall and spring)

141 **Scriptwriting** (3) Harvey
Study and practice of the forms, techniques, and types of writing for radio, television, and film. Prerequisite: Engl 11; EMda 75 for EMda majors.

142 **Radio and Television Performance** (3) Thiel
Introduction to the basic theories and techniques required for effective, nondramatic media performance (i.e., announcing, moderating, newscasting, etc.). Laboratory fee, $30.

144 **Sound Design** (3) Staff
Introduction to basic concepts of traditional audio and sound design as a creative communication medium; emphasis on design and technique for a variety of formats. Lecture (2 hours), laboratory (2 hours). Prerequisite: EMda 75. Laboratory fee, $30. (Fall and spring)

145 **Image Design** (3) Staff
Introduction to basic concepts of video as a creative communication medium: design and technique, planning, and directing in a studio context. Lecture (1 [illegible] hours), laboratory (3 [illegible] hours). Prerequisite: EMda 144. Laboratory fee, $40. (Fall)

146 **Television Directing** (6) Thiel
Advanced study and practice of television directing techniques. Students are expected to demonstrate skill in working with studio and field equipment and in developing television programs from original concepts to final production. Lecture (3 hours), laboratory (4 hours). Prerequisite: EMda 145 and permission of instructor. Laboratory fee, $40.

171 **Language of Cinema** (3) Travis
Introduction to cinema as language through analysis of the components of film structure—camera, editing, sound, movement, music, dialogue, and mise-en-scène. Laboratory fee, $30.

173 **History of Cinema** (3) Travis
An examination of the history, structure, and theory of motion pictures in America and abroad. Same as Art 173. Laboratory fee, $35. (Fall)

174 **Special Studies in Film** (3) Travis
In-depth study of specific film topics. Prerequisite: EMda 173. Laboratory fee, $30. (Spring)

175 **The Political Image** (3) Travis
An analysis of the techniques of propaganda and rhetoric used in film and television to visualize political ideology. Laboratory fee, $30.
(Spring, even years)

176 **Film as Fact and Fiction** (3) Travis
A comparison of structural differences between documentary and fiction film in order to study how each presents different versions of reality. Laboratory fee, $30. (Spring, odd years)

180 **Electronic Media Policy** (3) Sterling
Legal, technical, political, economic, and social aspects of radio, television, and cable and related delivery systems. Structure and operation of the FCC and other agencies, plus the role of Congress and the courts. Spectrum allocation

behavioral regulation, the trend to deregulate political influence, and current policy issues. Prerequisite: EMda 100.

181 **Media Management** (3) Staff
Decision making, strategic planning, and daily operations of radio, television, and cable; programming and sales strategies, promotion, and impact of ratings and research. Prerequisite: EMda 100.

182 **Innovation in Electronic Media** (3) Harvey
Examination of current and likely future trends in electronic media, with emphasis on radio, television, and cable, including developments in technology, programming, and public policy and their cultural implications. Prerequisite: EMda 100.

184 **International Communication** (3) Willnat
Major international news-gathering and broadcasting organizations, international communications policy forums, organizations and treaties, spectrum allocation criteria, communications technology, and trade in communication. Prerequisite: EMda 100.

185 **Comparative Communication Systems** (3) Willnat
In-depth study of the developmental, regulatory, political, economic, and cultural dimensions of selected foreign communication systems. Prerequisite: EMda 100.

188 **Effects of Electronic Media** (3) Staff
Concepts of the impact of broadcasting and related media on audiences, social science research findings and methods, including persuasion, formation of opinion, media and personal interaction, the depiction of violence, audience characteristics and media use patterns, and development of related theories and models of mass communication. Prerequisite: EMda 100.

190 **Selected Topics in Electronic Media** (3) Staff
Topic and fee announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

196 **Independent Study** (1 to 3) Staff
Independent research and special projects. Open to seniors. Before students are permitted to register, they must submit a written proposal of the plan of study and obtain approval of the faculty member who will be directing the study and of the program director.

197 **Internship** (1 to 3) Thiel
Open to seniors in electronic media. Students spend at least 16 hours a week in an approved media position with a local nonprofit, corporate, or commercial organization. Seminar meetings, reports, and career-oriented projects. Admission requires an application and approval of the program director. Grades are Pass/No Pass only. May be repeated once for credit.

MIDDLE EASTERN STUDIES

Program Committee: N. Brown (*Director*), D. Khoury, Y. Moses, B. Reich, H.M. Sachar

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in the field of Middle Eastern Studies.

***Bachelor of Arts with a major in Middle Eastern studies*—The following requirements must be fulfilled:**

1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Common Curriculum Requirements. The third year of language study must be completed through Arab 10 or Hebr 106.
3. **Required courses for the major—(a) 9 credit hours selected from Hist 107, 108, 158, 193, and 194; (b) 9 hours selected from PSc 176, 177, 178, 179, and 180; (c) 6 hours selected from Rel 9, 107, 112, 113, 115, 116, 123, 134, 161, 163, 164, and 165; (d) 6 hours selected from Econ 136, 151, 181–82; (e) 9 additional hours of course work related to the** Middle East from any department, to be selected in consultation with the program director.

Students should consult the program guidelines available from the Elliott School for courses pertinent to Middle Eastern studies. Courses in addition to those listed may be substituted with permission of the program director. Students should consult the program director concerning certain Special Topics or Selected Topics courses that may also be part of this program.

MUSIC

Professors R. Parris, R.J. Guenther (*Chair*)
Adjunct Professor G. Delente (*Piano*)
Associate Professors C.J. Pickar, L. Youens
Adjunct Associate Professors M. Garst (*Piano and Harpsichord*), M. Peris (*Piano*), A. Lee (*Voice*), R. Baker (*Voice*), R. Parnas (*Violin* and *Viola*), M. Sislen (*Guitar*)
Assistant Professor K. Ahlquist
Adjunct Assistant Professors J.E. White (*Voice*), J. Albertson (*Guitar*), F.B. Conlon (*Piano*), J.D. Levy (*Jazz Improvisation*), T. Konstantinov (*Piano*), B. Fritz (*Band*), R. Birch (*Trumpet*), L. Barnet (*Cello*)
Assistant Professorial Lecturer S. Hilmy (*Electronic Studio*)
Adjunct Instructors M. Findley (*Violin*), E. Guenther (*Pipe Organ*), L. Lipnick (*Bassoon*), B.R. Seidman (*Harp*), S. Wellman (*Voice*), R. White (*Oboe*), P. Edgar (*Percussion*), S.M. Fearing (*French Horn*), E.U. Kiehl (*Trombone*), D. Marsh (*Electric Bass*), M. Von Villas (*Opera*), J.C. Connell (*Percussion*), J. Krash (*Piano*), L. Hertel (*Flute*), E. Waters (*Guitar*), L. Gillham (*Recorder*), L. Marchisotto (*Accompanist*), R. Loza (*Percussion*), P. Fraize (*Jazz Performance/Saxophone*), R. Couto (*Trumpet*), S. Bender (*Voice*), B. Dahlman (*Piano*), J. Morin (*Baroque Collegium*), G. Raden (*Clarinet*), D. Alston (*Orchestra*), S. Brown (*Piano*), A. Reiff (*Voice*), S. Stang-McCusker (*Flute*), R. Angstine Smith (*Harp*), L. Ferguson (*Clarinet*), E. Goldstein (*Tuba*)

Bachelor of Arts with a major in music—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Mus 1, 2, 5–6, 9–10; 8 hours of applied music courses in the student's principal performance area.
3. The language competence option listed under the General Curriculum Requirements of Columbian School.
4. Required courses in the major—Mus 101–2, 103–4, 139; 4 hours of music ensemble courses; 4 additional hours either in applied music or music ensemble courses. The departmental requirement for proficiency in piano must be satisfied by the end of the semester preceding graduation. All majors are expected to attend and perform regularly in student recitals.

Bachelor of Music—Admission to the Bachelor of Music degree program with a major in performance requires demonstration by audition of special advanced pre-admission training and aptitude. In addition to the general requirements stated under Columbian School of Arts and Sciences, the 129-credit-hour program requires music courses as follows: Mus 5–6, 9–10, 101–2, 103–4, 131, 139, 151, 173; one 100-level elective each in music theory/composition and history/literature; 6 hours of ensemble courses; 20 hours of applied music in the major instrument or voice, including at least 12 hours in 100-level courses; 6 hours of additional courses in performance; and 14 hours of electives. The departmental requirement of proficiency in piano must be satisfied by the semester preceding graduation. Students in this program are required to pursue the language competence option listed under the General Curriculum Requirements of Columbian School. A half recital is required during the junior year, and a full public recital is required during the senior year. All majors are expected to attend and perform regularly in student recitals.

Minor in music—21 credit hours of music courses, consisting of Mus 1, 2 or 9, 5, 101– or 103–4, 6 hours of applied music study, and 2 hours of music electives. Level 1 piano proficiency is required; students with sufficient piano proficiency, as determined by examination, may elect another applied music area for concentration. Recital attendance and public performance are required.

Minor in jazz studies—21 credit hours of music courses, consisting of Mus 1, 2, 8, 9–10, 70, 161; 4 hours of jazz performance techniques (Mus 59–60 or 159–60); and 2 hours of ensemble participation (Mus 52 or 55). Students must satisfy the requirement of Level 1 jazz piano proficiency. Mus 1 and 2 are prerequisite to declaration of the jazz studies minor. Recital attendance and public performance are required.

Departmental Prerequisite: Mus 1 and 2 are prerequisite to all other courses required of music majors with the exception of applied music and ensemble courses. A student must demonstrate Level 1 proficiency in piano and must achieve a grade of *C* or better in Mus 1 and 2 to be allowed to declare the music major in the B.A. curriculum. All students with a declared major in music are required to emphasize performance study in one instrument or voice and to appear for performance final examinations at the end

each semester of study in that area; a minimum of three consecutive examinations is required. A placement audition to determine the initial level of study is administered at the time the major is declared. Satisfactory progress in the principal performance area, as determined by the department's repertoire and study-level guidelines and performance final examinations, is required for continuance in the major. Continuous registration in piano is required of all declared music majors and minors until the relevant piano proficiency requirements have been met. Regular attendance at public concerts and recitals is required of all music majors and minors as a part of their applied music study.

MUSIC THEORY, HISTORY, AND LITERATURE

1 **Elements of Music Theory** (3) Hilmy
Theoretical and written coverage of notation, scales, keys, intervals, terms, rhythms, and chord structure and progression. Introduction to music literature, with emphasis on rudimentary aural analysis. Concurrent registration in Mus 2 is required for music majors. (Fall and spring)

2 **Ear Training I** (1) Ahlquist, Krash
Aural skills development through melodic, harmonic, and rhythmic dictation and sight singing. Content is coordinated with Mus 1. Two 50-minute sessions per week. (Fall and spring)

3 **Introduction to Musical Understanding** (3) Pickar
Introductory history of musical styles, related to listening; study of music materials and media. Not open to music majors. (Fall and spring)

4 **Topics in Music for Non-Majors** (3) Staff
A rotating set of classes on American music topics, a composer, the opera, and musical life in Washington, D.C. Not open to music majors. (Spring)

5–6 **Harmony** (3–3) Parris
Triads, inversions; chord analysis, construction, and progression; figured-bass realization, part writing, modulation, altered chords. Concurrent registration in the appropriate section of Mus 9–10 is required for music majors. Prerequisite: Mus 1; Mus 5 is prerequisite to Mus 6. (Academic year)

7 **Music of the World** (3) Ahlquist
Study of music from selected cultures around the world. (Spring, alternate years)

8 **History of Jazz** (3) Staff
Introduction to the styles, composers, and performers of jazz music from its origins to the present. (Fall)

9 **Ear Training II** (1) Ahlquist
Content is coordinated with Mus 5. Two 50-minute sessions per week. Prerequisite: Mus 2. (Fall)

10 **Ear Training III** (1) Ahlquist
Content is coordinated with Mus 6. Two 50-minute sessions per week. Prerequisite: Mus 9. (Spring)

70 **Introduction to Jazz Harmony** (3) Levy
This course develops the ability to analyze and write tunes in jazz/pop styles. Study of rhythmic characteristics, voice-leading, and chord scale relationships within a jazz context. Prerequisite: Mus 1. (Spring)

101–2 **History of Music I** (3–3) Youens
Development of music in the Western world from the early Christian era through the Baroque. Prerequisite: Mus 1; Mus 101 is prerequisite to Mus 102. (Academic year)

103–4 **History of Music II** (3–3) Ahlquist
Development of Western music from the Classical period to the present. Prerequisite: Mus 5 or permission of instructor; Mus 103 is prerequisite to Mus 104. (Academic year)

109 **Orchestra Literature** (3) Guenther
Survey of the history and styles of orchestra literature, analysis of representative works. Prerequisite: Mus 5 or permission of instructor. (Spring)

110 **Chamber Music Literature** (3) Youens
Survey of the history and styles of chamber music literature, analysis of representative works. Prerequisite: Mus 5 or permission of instructor. (Spring)

121 The Opera (3) Youens
Survey of the history and styles of opera, analysis of representative works. Prerequisite: Mus 5 or equivalent. (Fall, odd years)

125 Keyboard Music Literature (3) Staff
Survey of the history, style, and major content of the keyboard literature from the 16th century to the present. Prerequisite: Mus 5 or equivalent.

131–32 Advanced Theory (3–3) Parris
Practice in 18th-century contrapuntal writing and analysis, chorale preludes, inventions, and fugues. Prerequisite: Mus 5–6 or equivalent; Mus 131 is prerequisite to Mus 132. (Alternate academic years)

133–34 Composition (3–3) Parris
May be repeated for credit. Prerequisite: Mus 6. (Academic year)

135 Counterpoint (3) Parris
Study and practice of 16th-century contrapuntal techniques. Prerequisite: Mus 131.

137 Orchestration (3) Parris
Instrumental scoring. Prerequisite: Mus 6.

139 Form and Analysis (3) Parris, Guenther
Analysis of musical forms in representative musical literature. Prerequisite: Mus 5–6 or equivalent. (Spring)

151 Conducting (3) Fritz
Technique of conducting, score reading, rehearsal procedures, analysis, and interpretation of selected musical literature, practice in conducting. Prerequisite: Mus 5. (Fall, even years)

161–62 Electronic and Computer Music (3–3) Hilmy
Fundamental electronic and computer music concepts. Analog and digital sound synthesis techniques and theory, MIDI, studio recording techniques, signal processing, properties of sound, acoustics and psycho-acoustics, history and aesthetics. Laboratory fee: $50 per semester. (Academic year)

173 Pedagogy (3) Staff
Principles, materials, and methods of teaching in selected areas. Prerequisite: admission to 100-level performance study.

199 Independent Research (3) Staff
Under the guidance of an assigned instructor. Open only to qualified music majors. May be repeated for credit. (Fall and spring)

APPLIED MUSIC

Applied music courses are offered both fall and spring, and may be repeated for credit. For courses numbered 11 through 50 and 57 through 60, students may not register in the same semester for both the 1- and 2-credit course in the same instrument or in voice. Mus 51, 52, 53, 55, 56, and 153 do not include individual lessons and do not require a supplementary fee. Mus 61–62 and 63, involving group study of beginning piano and voice, likewise do not require a supplementary fee. All other applied music courses include individual lessons and require a supplementary fee, as follows:

1. One-credit-hour courses: individual lessons of one-half hour a week, supplementary fee, $75.

2. Two- or three-credit-hour courses: individual lessons of one hour a week, supplementary fee, $150.

Supplementary fees for applied music courses are nonrefundable after the first two weeks of the fall and spring semesters. Consult the Music Department for details.

The supplementary fee is waived during the fall and spring semesters for full-time music majors and minors and for Presidential Arts Scholars in Music.

Departmental prerequisite: For Mus 11–12, Mus 61 or 62 or demonstration of adequate preparation. For Mus 15–16, level 2 piano proficiency or permission of instructor.

Required practice: three hours a week for 1-credit courses and six hours a week for 2-credit courses.

11–12 Piano (1–2) Staff
13–14 Voice (1–2) Staff
15–16 Pipe Organ (1–2) E. Guenther
17–18 Violin (1–2) Parnas, Findley, Steiner
19–20 **Classical Guitar** (1–2) Waters, Albertson, Sidell
21–22 Viola (1–2) Parnas

23–24 **Cello** (1–2) Barnet
25–26 **Bass** (1–2) Marsh
27–28 **Flute** (1–2) Hertel, Stang-McCusker
29–30 **Recorder** (1–2) Gilliam
31–32 **Oboe** (1–2) R. White
33–34 **Clarinet** (1–2) Raden
35–36 **Saxophone** (1–2) Fraize
37–38 **Bassoon** (1–2) Lipnick
39–40 **French Horn** (1–2) Fearing
41–42 **Trumpet** (1–2) Birch
43–44 **Trombone** (1–2) Kiehl
45–46 **Percussion** (1–2) Edgar, Connell
47–48 **Harp** (1–2) Seidman, Smith
49–50 **Tuba** (1–2) Goldstein

51 **University Symphony Orchestra** (1) Alston
Preparation and performance of orchestral literature. Prerequisite: audition before director.

52 **Instrumental Ensemble** (1) Staff
Chamber ensemble groups approved by audition. See the *Schedule of Classes* for complete listing: Section numbers are .10 flute choir, .11 guitar ensemble, .12 percussion ensemble, .13 jazz combo, .14 keyboard ensemble, .15 string ensemble, .16 woodwind ensemble, .17 brass ensemble, .18 Baroque collegium, .19 Latin band, .20 blues revue.

53 **University Singers** (1) Pickar
Preparation and performance of choral literature. Prerequisite: audition before director.

55 **Jazz Band** (1) Levy
Preparation and performance of classic and contemporary "big band" literature. Prerequisite: audition before director.

56 **University Band** (1) Fritz, Birch
Section .10 is University Symphonic Band; Section .11 is University Wind Ensemble.

57–58 **Harpsichord** (1–2) Garst, Parris
59–60 **Jazz Performance Techniques** (1–2) Staff
See the *Schedule of Classes* for complete listing: Section numbers are .10 piano, .11 bass, .12 percussion, .13 guitar, .14 brass, .15 woodwind.

61–62 **Class Piano for Beginners** (1–2) Konstantinov, Krash, Dahlman, Levy
Mus 61: Study of the rudiments of musical notation and piano playing in a small classroom setting; designed to take students who do not read music to a beginner's level of proficiency. Mus 62: Applied piano study in a small classroom setting; designed to prepare music majors and minors to attain Level 1 of the departmental piano proficiency requirement. Open to all undergraduates.

63 **Class Voice for Beginners** (1) Staff
Study of the rudiments of musical notation and basic vocal technique in a small classroom setting. Open to all undergraduates.

81–82 **Lute** (1–2) Albertson

Departmental prerequisite: For 100-level applied music courses, an audition before an appropriate faculty committee.

Required practice: six hours a week for 1-credit courses and 12 hours a week for 3-credit courses. In addition, 3-credit courses include master performance classes and require performance in student recitals and appearance for a performance final examination.

111–12 **Piano** (1–3) Staff
113–14 **Voice** (1–3) Staff
115–16 **Pipe Organ** (1–3) E. Guenther
117–18 **Orchestral Instrument** (1–3) Staff
119–20 **Classical Guitar** (1–3) Albertson, Sislen, Waters

153 **Vocal Theater Workshop** (1) Von Villas, Conlon
A performance-oriented program. In the fall semester the stress is on development of body awareness for the stage, acting improvisations, and character development. Scenes chosen from the opera, operetta, and musical theater repertoire. In the spring semester, musical coaching, use of makeup, and audition preparation is included.

155–156 Voice Study for the Theatre (1–3) Staff
157–158 Harpsichord (1–3) Garst, Parris
159–60 Jazz Performance Techniques (1–3) Staff

NAVAL SCIENCE

Professor W.S. Kordis (*Chair*)
Associate Professor E.V. O'Brien
Assistant Professors C.R. Wheeler, C.A. Cantarella, D.M. Albrecht, R.T. Lawrence

Naval Reserve Officers Training Corps Program

The Naval Reserve Officers Training Corps (NROTC) offers young men and women the opportunity to qualify for a full scholarship and a commission in the Navy or Marine Corps. NROTC midshipmen are required to complete the naval science courses and attend weekly professional seminars. During the summer, NROTC midshipmen participate in active duty at sea or shore-based training cruises for approximately four weeks. Upon receiving the baccalaureate and completing the NROTC program, qualified midshipmen are commissioned as ensigns in the Navy or second lieutenants in the Marine Corps. Students may join the NROTC through any one of the following four programs.

Four-Year Scholarship Program—Students enter the NROTC Four-Year Scholarship Program through national competition and are appointed midshipmen in the Naval Reserve. While enrolled, if awarded a full four-year scholarship, the government provides tuition, fees, books, uniforms, and an allowance of $150 per month. Upon graduation students are commissioned with a four-year active duty service obligation. Scholarship Program students must include in their degree program courses in English, calculus, computer science, physics, national security policy, and naval science and participate in three summer training periods of approximately four weeks each.

Two-Year Scholarship Program—Selection for this program is made through national competition, based on the student's academic record, physical qualifications, and an interview. Application should be made by the middle of the fall semester of the student's sophomore year. Selected applicants attend six weeks of instruction at the Naval Science Institute (NSI) at Newport, Rhode Island, during the summer before their third academic year. At NSI, students take courses in naval science, physical fitness, and drill, similar to those required of four-year NROTC students during their freshman and sophomore years. Successful completion of the NSI qualifies the two-year applicants for appointment as midshipmen in the Naval Reserve and enrollment in the NROTC Scholarship Program. Upon acceptance of this appointment, students receive all the benefits and assume all the obligations of midshipmen in the Four-Year Scholarship Program.

Entering freshmen and transfer students who are awarded NROTC scholarships and plan to live on campus may also be eligible for GW Residence Hall Awards from the University. NROTC scholars with prior experience in the Navy are eligible for awards covering the nominal charges for on-campus housing and meals. NROTC scholars who are new to the Navy and are majoring in mathematics, chemistry, physics, or a program in the School of Engineering and Applied Science may receive up to $4,000 to be applied toward the costs of on-campus housing and meals. Further information on these awards is available from the University Office of Admissions.

Four-Year College Program—Students are enrolled in the Four-Year College Program upon acceptance by the Department of Naval Science. Uniforms are provided, and during their junior and senior years, students receive $150 per month. Students must include in their degree program courses in mathematics, science, and naval science, attend the first class summer at-sea training period, accept a commission in the Naval Reserve or Marine Corps Reserve on graduation with an eight-year active/reserve service obligation, and serve on active duty after graduation for at least three years. Midshipmen who complete one term as College Program students, have a satisfactory academic record, and are physically qualified may compete for a scholarship awarded by the Chief of Naval Education and Training. If awarded, the scholarship will be for the remainder of the student's undergraduate enrollment, up to a maximum of three and a half years; service requirements and benefits are the same as for the scholarship programs.

Two-Year College Program—Application should be made by the middle of the fall semester of the student's second year. Selections are made through the Chief of Naval Education and Training, based on the student's academic record, physical qualifications, and an interview. Those students selected will attend the NSI and upon successful

completion may enroll in the program. The benefits and obligations are the same as for the Four-Year College Program.

Requirements for all candidates—Qualifications for acceptable candidates for the Scholarship Program or the College Program include U.S. citizenship, fulfillment of physical requirements, and willingness to participate in required summer training periods and to accept a commission in the Naval Reserve or Marine Corps Reserve when offered.

Enrollment in NROTC is not a requirement for taking naval science courses. Any student enrolled at George Washington University may take naval science courses with the approval of the Professor of Naval Science.

Degree Credit for Naval Science Courses

Columbian School of Arts and Sciences—NSc 126, 160, and 180 are acceptable as electives. Up to 12 credit hours (for NSc 52, 150, 175, and 176) may be accepted as professional electives in Columbian School.

School of Engineering and Applied Science—NSc 126 and 160 may be used for social science credit. Technical elective credit is acceptable as follows: for majors in civil engineering and mechanical engineering—NSc 52, 150, 175; for majors in electrical engineering—NSc 52 and 150; for majors in systems analysis and engineering—NSc 150, 151, 175, and 176.

School of Business and Public Management—All NSc courses are applicable to the B.B.A. and B.Acct. degree programs; check with the director of undergraduate advising and student services in SBPM.

Elliott School of International Affairs—NSc 126, 160, 175, 176, and 180 may be used as elective credit in all undergraduate programs.

51 Introduction to Naval Science (3)
A general introduction to the naval profession and to concepts of sea power. The mission, organization, and warfare components of the U.S. Navy and Marine Corps. Overview of officer and enlisted ranks and rates, training and education, and career patterns. Naval courtesy and customs, military justice, leadership, and nomenclature. Professional competencies required to become a naval officer.

52 Naval Ships Systems I (Engineering) (3)
A detailed study of ship characteristics and types, including ship design and control, propulsion, hydrodynamic forces, stability, compartmentation, and electrical and auxiliary systems. Included are basic concepts of the theory and design of steam, gas turbine, and nuclear propulsion.

125 Naval Ships Systems II (Weapons) (3)
Theory and employment of weapons systems, including the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Fire control systems and major weapons types, including capabilities and limitations. Physical aspects of radar and underwater sound. Facets of command, control, and communications as means of weapons system integration.

126 Sea Power and Maritime Affairs (3)
A survey of the U.S. naval history, with emphasis on major developments. The geopolitical theory of Mahan. Present-day concerns in sea power and maritime affairs, including the economic and political issues of merchant marine commerce and the law of the sea. Naval aspects of U.S. conflicts from the American Revolution to Vietnam.

150 Navigation and Naval Operations I (3)
Students develop practical skills in naval piloting procedures. Charts, visual and electronic aids, and theory and operation of magnetic and gyro compasses; inland and international rules of the nautical road. A broad overview of the celestial coordinate system, including spherical trigonometry and how celestial information can be applied to navigation at sea. Basic principles of environmental factors affecting naval operations.

151 Navigation and Naval Operations II (3)
Relative motion vector analysis theory, formation tactics, and ship employment; practical skills in relative motion problems. Controllable and noncontrollable forces in shiphandling, ship behavior, and maneuvering characteristics; various methods of visual communication, including flaghoist, flashing light, and semaphore.

160 **Evolution of Warfare** (3)
This course traces the development of warfare, from earliest recorded history to the present, with focus on the impact of major military theorists, strategists, tacticians, and technological developments. The student acquires a basic sense of strategy and develops an understanding of military alternatives and the impact of historical precedent on military thought and actions.

175 **Leadership and Management I** (3)
Organizational behavior, management, and leadership principles in the context of naval organization. The management functions of planning, organizing, and controlling; individual and group behavior in organizations; motivation and leadership. Experiential exercises, case studies, and laboratory discussions. Decision making, communication, responsibility, authority, and accountability.

176 **Leadership and Management II** (3)
The interaction of leadership, organizational behavior, and human resource management. Employee interviewing and counseling, performance appraisal, military and civilian law, and managerial ethics and values. This capstone course integrates professional competencies to develop understanding of the issues faced by leaders, managers, and naval officers.

180 **Amphibious Warfare** (3)
A historical survey of the development of amphibious doctrine and the conduct of amphibious operations. The evolution of amphibious warfare in the 20th century, especially during World War II. Present-day potential and limitations on amphibious operations, including the concept of rapid deployment force.

OPERATIONS RESEARCH

Professors N.D. Singpurwalla, J.E. Falk, R.M. Soland (*Chair*), T.A. Mazzuchi, G. Frieder
Adjunct Professor R.H. Clark
Professorial Lecturers J.F. Ince, J.L. Kreuser
Associate Professorial Lecturer C.H. Voas
Assistant Professors T.Z. Irony, H.G. Abeledo

See the School of Engineering and Applied Science for the program of study leading to the Bachelor of Science (Systems Analysis and Engineering).

101 **Survey of Operations Research: Deterministic Models** (3) Abeledo and Staff
Basic concepts and techniques of deterministic operations research modeling as applied to problems in industrial and governmental decision making. Linear, integer, nonlinear, and dynamic programming; networks; game theory. Prerequisite: Math 33. (Fall)

102 **Survey of Operations Research: Stochastic Models** (3) Soland and Staff
Basic concepts and techniques of stochastic operations research modeling as applied to problems in industrial and governmental decision making. Markov chains, queuing, inventory, forecasting, decision analysis, regression analysis, and simulation. Prerequisite: ApSc 115, Math 33. (Spring)

109 **Mathematics in Operations Research** (3) Abeledo and Staff
Mathematical foundations of optimization theory; linear algebra, advanced calculus, real analysis. Geometrical interpretations. Numerical methods and use of software. Applications to modeling techniques in operations research. Prerequisite: Math 33. (Fall and spring)

135 **Systems Thinking and Policy Modeling I** (3) Clark and Staff
Stock-flow analysis of feedback systems presented for policy analysis and management. System dynamics; principles of systems employed to structure the problem-solving process. Problems and case studies solved using microcomputers. (Fall and summer)

151 **Linear Programming** (3) Abeledo and Staff
The Simplex method, its variants, and recent interior point methods considered from theoretical and computational points of view. Duality, sensitivity, and parametric programming. Decomposition methods for large-scale problems. Prerequisite: OR 101, 109, or permission of instructor. (Fall and spring)

154 **Applications of Linear and Nonlinear Optimization Theory** (3) Falk and Staff
Analysis of optimization models, including areas of nutrition, water pollution, energy, reliability, inventory control, game theory, chemical equilibrium, non-

folio selection, and parameter estimation. Solution of models via the GAMS modeling software. Prerequisite: Math 33. (Fall)

171 **Forecasting Techniques** (3) Mazzuchi and Staff
Regression analysis and other heuristic forecasting techniques. Detailed development of the Box–Jenkins technique for time-series analysis, including moving averages and exponential smoothing as special cases. Application to engineering, business, and economics using special computer software packages. Prerequisite: ApSc 116. (Fall)

173 **Discrete Systems Simulation** (3) Irony and Staff
Simulation of discrete stochastic models. Simulation languages. Random-number random-variate generation. Statistical design and analysis of experiments, terminating nonterminating simulations; comparison of system designs. Determination of input distributions. Variance reduction. Validation of models. Prerequisite: ApSc 116, CSci 51, or permission of instructor. (Spring)

182 **Quality Control and Acceptance Sampling** (3) Mazzuchi and Staff
Mathematical and statistical approaches to quality assurance. Control charts, acceptance sampling by attributes and variables, outgoing quality levels, cost of quality, relationship between reliability and quality. Bayesian techniques and time-series methods. Prerequisite: ApSc 115 or permission of instructor. (Spring)

191 **Problems in Operations Research** (3) Soland and Staff
Field experience in operations research on a team basis. Each small group locates an actual problem and formulates a solution using operations research models. Oral and written reports. Prerequisite or corequisite: EMgt 269; OR 173, and 151 or 154. (Fall and spring)

PEACE STUDIES

Committee on Peace Studies
P. Caws, P. Churchill (*Coordinator*), T.L. Hufford, M. Moore, P. Palmer, J. Post, M. Price, H. Yeide

Students in Columbian School of Arts and Sciences may earn a minor in peace studies by taking 18 credit hours that include PStd 10 and 190 plus at least one course from each of the following groups.

Peace as a Human Value—Phil 133; Rel 121; WStu 125

Peace and National and International Systems—Econ 136, 181; Geog 133; Hist 128–29, 157, 184; PSc 140, 142, 144, 149.

Peace and Interpersonal Relations—EMda 175; Psyc 119, 129, 156; Soc 184.

With approval of the advisor, Selected Topics courses and 700 Series courses in related subjects may be counted toward the minor. An internship in a relevant agency (through SLP 152) may also count for 3 hours of credit, with advisor's prior approval.

10 **Introduction to Peace Studies and Conflict Resolution** (3) Churchill
Exploration of the nature of war and its causes, peace as a negative concept (absence of war) and as a positive concept (basis for long-range harmonious relations in personal communication and international life); and the transition from the negative to the positive concept.

190 **Peace Studies Project** (3) Staff
Integration of previous academic experience related to peace studies and a groundwork for possible future engagement with peace concerns through graduate work, career choice, or volunteer activities. To be taken in the semester when requirements for the minor are completed.

PHILOSOPHY

University Professors P.J. Caws, K.F. Schaffner
Professors R.H. Schlagel, R.S. French, W.B. Griffith (*Chair*), R.P. Churchill, A. Altman
Associate Professor D. DeGrazia
Assistant Professor G. Weiss

Two options are offered for the major in philosophy, both designed to give a broad background in philosophy but with somewhat different emphases. The first option reflects the traditional structure of the discipline and its subfields; it is especially recommended for

those considering the possibility of graduate study in philosophy. The second option is designed for those primarily interested in philosophy in its relationship to public affairs

Bachelor of Arts with a major in philosophy (traditional option)—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite course—Phil 51 or 52 or equivalent.
3. Required courses in related areas—6 hours selected from art history, classics (Clas 71, 72, 113, 127), history (Hist 39–40 recommended), humanities, or music history 3 hours of non-Western religious philosophy selected from Rel 157, 158, 160, 161, 164
4. Required courses in the major—a minimum of 30 credit hours, including as foundational courses Phil 111, 112, 131, and 152; one course selected from Group A (normative)—Phil 132, 133, 142, 162; one course selected from Group B (epistemological)—Phil 121, 125, 151, 153; two courses selected from Group C (19th- and 20th-century)—Phil 113 172, 192, 193; the proseminar—Phil 198, plus one elective chosen from 100-, 200-, or 700-level courses, selected in consultation with a departmental advisor

For students considering continuing in graduate school, it is recommended that they include in their programs of study 6 credit hours of French or German plus Phil 121, 151 153, 192, and 193.

Bachelor of Arts with a major in philosophy (public affairs option)—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite course—Phil 51 or 52 or equivalent.
3. Required courses in related areas—6 credit hours selected from Hist 39–40, 71–72. PSc 105, 106, 107, 110, 114, 115; Econ 11–12, 101–2, 104.
4. Required courses in the major—a minimum of 30 credit hours, including as foundational courses Phil 131, 132; two courses selected from Group A (social, political, and legal)—Phil 125, 133, 135, 142; two courses selected from Group B (historical)—Phil 111 and 112 *or* Phil 111 or 112 and one course selected from Phil 113, 172, 193; one course selected from Group C (analytical and epistemological)—Phil 121, 151, 152, 192, the proseminar—Phil 198; two electives selected in consultation with the advisor from 100-, 200-, or 700-level courses (Phil 231, 235, 242, 255, 262, 770, 772, 773, 775, and 778 are recommended).

Minor in philosophy—Required: a minimum of 18 credit hours of philosophy courses including two courses chosen from Phil 51, 52, 111, 112, 113; one course chosen from Phil 127, 131, 132, 133, 135, 142, 162; and one course chosen from Phil 121, 125, 151 152, 153.

Minor in applied ethics—Required: 18 credit hours of philosophy courses, including Phil 51 or 52, and 131 and 132, plus three courses selected from Phil 133, 135, 142, 7[illegible] (*Current Issues in Bioethics*); with permission of the instructor, seniors may select from Phil 230, 231, 235, 242, 262, which are listed in the Graduate Programs Bulletin

45 Introduction to Logic (3) Staff
Introduction to methods of deductive and inductive logic with emphasis on sentential calculus. Argument analysis, recognition of fallacies, legal reasoning and practical applications of logic. (Fall, spring, and summer)

51–52 Historical Introduction to Western Philosophy (3–3) Staff
Readings from major philosophers and study of their philosophical positions in historical, social, and cultural context. Phil 51: Classical, medieval, and early modern philosophers: Socrates through Locke. Phil 52: Enlightenment, 19th- and 20th-century philosophers: Locke through Sartre. Students are strongly encouraged to take Phil 51 before Phil 52. (Academic year)

62 Philosophy and Film (3) Cawe
An introduction to philosophical problems and methods through discussion of some of the many philosophical questions raised by classical and contemporary films. (Spring)

111 History of Ancient Philosophy (3) Schlage
History of Western philosophy from early Greece, including the Near East, with major emphasis on the Pre-Socratics, Socrates, Plato, and Aristotle. (Fall)

112 History of Modern Philosophy (3) Churchl
History of Western philosophy of the 16th through 18th centuries: Continental Rationalism and British Empiricism from the scientific revolution through

Enlightenment; major emphasis on Montaigne, Descartes, Spinoza, Locke, Berkeley, Hume, and Kant. Prerequisite: Phil 51 or 52 or equivalent. (Spring)

113 **19th-Century Philosophy** (3) Altman and Staff
European philosophy of the 19th century, with major emphasis on Kant, Hegel, Schopenhauer, Kierkegaard, and Nietzsche. (Fall)

121 **Symbolic Logic** (3) Griffith and Staff
Formal evaluation of deductive arguments in politics, law, economics, etc. Additional topics: metatheory of deductive systems; modal logics; logic and computers. Prerequisite: Phil 45 or permission of instructor. (Spring)

125 **Philosophy of Race and Gender** (3) Weiss
A theoretical examination of race and gender as cultural categories that we negotiate through the politics of our bodies. Interpersonal relations, language, knowledge, and the media. (Fall)

131 **Ethics: Theory and Applications** (3) Griffith, DeGrazia, Churchill
Examination of leading ethical theories, e.g., utilitarianism, deontology, virtue theory, as well as anti-theory and methodology in ethics. Applications to contemporary problems. (Fall)

132 **Social and Political Philosophy** (3) Altman, Griffith
Philosophical theories about how economic, political, legal, and cultural institutions should be arranged. Topics include the meaning and significance of liberty, the legitimate functions of government, the nature of rights, the moral significance of social inequality, and the meaning of democracy. (Spring)

133 **Philosophy, Nonviolence, and War** (3) Churchill
The course will consider one or more of the following topics: philosophical foundations of pacifism and nonviolent resistance; philosophical inquiry into causes and prevention of war, aggression, genocide; moral constraints on national defense and foreign policy, and the doctrine of just war. (Spring, odd years)

135 **Ethics in Business and the Professions** (3) Staff
Basic concepts and theories of ethics for analysis of moral issues arising in business and professional practice. (Fall and spring)

142 **Philosophy of Law** (3) Altman
Systematic examination of fundamental concepts of law and jurisprudence; special emphasis on the relationship between law and morality. (Fall)

151 **Science and the Modern World** (3) Schlagel
Comparison of the cosmological frameworks of Aristotle, Newton, Einstein, and quantum mechanics. Emphasis on changing concepts and methodologies, modes of explanation, and ontological implications. (Fall)

152 **Knowledge and Reality** (3) Schlagel, DeGrazia
Inquiry into the basis and structure of knowledge, the problem of perception and independent reality, the role of language in knowledge, and the meaning and criteria of truth. Prerequisite: Phil 52 or 112 or permission of instructor. (Spring)

153 **Mind, Brain, and Artificial Intelligence** (3) Schlagel
Consideration of the mind–body problem in relation to neurophysiology, cognitive psychology, and artificial intelligence: for example, dualism, functionalism, identity theory, and eliminative materialism. Evaluation of the claims of formalists and neural network researchers to simulate human intelligence. (Spring, odd years)

161 **Philosophy and Literature** (3) Caws, Weiss
Critical investigation of the sociopolitical commitments that inform the practices of reading and writing as discussed by Sartre, Barthes, Foucault, Baudrillard, and others. Focus on the development of existentialist themes, including authenticity, freedom, temporality, and death in the work of Kafka, Tolstoy, Mann, Woolf, Sexton, and Stein. (Spring)

162 **Aesthetics** (3) Weiss
The problem of artistic representation and the nature of aesthetic experience as related to the creation, appreciation, and criticism of art. Special emphasis on nonrepresentational works of art and their interpretation. (Fall)

172 **American Philosophy** (3) Staff
Philosophies of Peirce, Royce, James, Dewey, and Santayana as representatives of American thought.

192 **Analytical Philosophy** (3) DeGrazia
The dominant movements of 20th-century Anglo-American philosophy, including logical positivism, British ordinary language philosophy, and neoprag-

matism, as represented by Russell, G.E. Moore, Wittgenstein, Ayer, Quine Kripke *et al.* Prerequisite: One other second-group philosophy course. (Fal

193 **Phenomenology and Existentialism** (3) Caws, Weis
An intensive exploration of the ontological and existential philosophies o Kierkegaard, Bergson, Husserl, Heidegger, Sartre, Merleau-Ponty, de Beauvoir and Camus. Prerequisite: One other second-group philosophy course. (Spring)

198 **Proseminar** (3) Staf
Variable topics; preparation and presentation of a major research paper. Open only to philosophy majors, in either the junior or senior year as approved by major advisor.

199 **Readings and Research** (3) Staf
(Fall and spring)

PHYSICS

Professors O. Bergmann, A.J. Zuchelli, D.R. Lehman, B.L. Berman (*Chair*), L.C. Maximon (*Research*)
Professorial Lecturer R. Corbet
Associate Professors W.C. Parke, N.K. Khatcheressian, E.P. Harper, W.J. Briscoe, J.R. Peverley, H. Haberzettl, K.S. Dhuga
Associate Professorial Lecturers J.T. Broach, C.T. Christou
Assistant Professors C. Bennhold, M.E. Reeves, T.P. Devereaux, G. Feldman
Adjunct Assistant Professor A. Eskandarian
Assistant Professorial Lecturer S.L. Rugari

Bachelor of Arts with a major in physics—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences
2. Prerequisite courses—Phys 41, 42, 43; Chem 11; Math 31, 32, 33.
3. Required courses in related area—CSci 49 or 50 or 100.
4. Required courses in the major—Phys 151, 161, 163, 152 or 164, 165–66, 167, 19 or 196. Recommended electives: Phys 162, 168, 170, 175; Math 111, 112.

Bachelor of Science with a major in physics—The following requirements must be fulfilled.
1. The general requirements stated under Columbian School of Arts and Sciences
2. Prerequisite courses—Phys 41, 42, 43; Chem 11; Math 31, 32, 33.
3. Required courses in related area—CSci 49 or 50 or 100. Recommended electives—Math 111, 112.
4. Required courses in the major—Phys 151–52, 161, 162, 163, 164, 165–66, 167, 16 195. Recommended electives—Phys 170, 175. The B.S. curriculum is recommended f students who plan graduate study in physics or engineering.

Bachelor of Arts with a major in physics and Bachelor of Science in any SEAS undergraduate field—Five-year programs leading to these two degrees are available. Pleas check with the Department of Physics or with the School of Engineering and Applie Science.

Special Honors—To graduate with Special Honors, a student must meet the eligibi requirements stated under the University Regulations and submit for departmen approval an honors thesis based on a two-semester research project. In addition, th student must have a cumulative grade-point average of at least 3.5 in physics courses and 3.0 overall.

Minor in physics—Required: Phys 41, 42, 43; Phys 163 and 164 or approved substitute from 100-level physics courses.

With permission, a limited number of graduate courses in the department may be take for credit toward an undergraduate degree. See the Graduate Programs Bulletin for cours listings.

ASTRONOMY

1 **Introduction to Astronomy I** (3) Maximon, Dhug
Primarily for non-science majors. Classical through modern astronomy, with in troduction to basic principles underlying astronomical systems and observa tions. Lectures cover electromagnetic radiation, optical instruments, and the

solar system. Laboratory (2 hours) emphasizes optics and astronomical measurements. Prerequisite: high school algebra. Laboratory fee, $50. (Fall)

2 **Introduction to Astronomy II** (3) Maximon, Dhuga
Primarily for non-science majors. Stellar and extragalactic astronomy, including introduction to quantum aspects of electromagnetic radiation and atomic physics, stellar spectra, and stellar evolution. Essential material from Astr 1 included. Laboratory (2 hours) has the same emphasis as in Astr 1. Prerequisite: high school algebra. Laboratory fee, $50. (Spring)

51 **Modern Cosmology** (3) Parke
A non-mathematical treatment of cosmology, describing the origin and evolution of the universe. Topics include the nature of quasars, pulsars, stellar and galactic black holes, antimatter, gravitational lensing, dark matter, cosmic background radiation, the origin of the elements, big-bang theory, and the future of the universe. Prerequisite: Astr 1 and 2.

191 **Space Astrophysics** (3) Corbet
Physical processes of celestial phenomena as determined from space-based instrumentation. While the entire electromagnetic spectrum is covered, the high-energy (X-ray and gamma ray) region is emphasized. Results from ground-based instrumentation (e.g., radio and optical) may be introduced. Prerequisite: Phys 43 or equivalent. (Fall)

PHYSICS

1 **General Physics I** (3) Feldman, Zuchelli
Classical physics. Mechanics, including Newton's laws of motion, force, gravitation, equilibrium, work and energy, momentum, and rotational motion; periodic motion, waves, and sound, heat and thermodynamics. Prerequisite: high school trigonometry. Concurrent registration in Phys 5 is strongly recommended. (Fall and spring)

2 **General Physics II** (3) Zuchelli, Feldman
Classical and modern physics. Electrostatics, electromagnetism, direct and alternating current circuits, and electromagnetic radiation; geometrical and physical optics; special relativity; quantum theory; atomic physics, nuclear physics; particle physics; astrophysics and cosmology. Prerequisite: Phys 1. Concurrent registration in Phys 6 is strongly recommended. (Fall and spring)

5 **General Physics Laboratory I** (1) Parke, Bergmann
Laboratory complement of Phys 1 and 21 (2½ hours). Prerequisite: concurrent or prior registration in Phys 1 or concurrent registration in Phys 21. Laboratory fee, $50. (Fall and spring)

6 **General Physics Laboratory II** (1) Bergmann, Briscoe
Laboratory complement of Phys 2 and 22 (2½ hours). Prerequisite: concurrent or prior registration in Phys 2 or concurrent registration in Phys 22. Laboratory fee, $50. (Fall and spring)

7 **Music and Physics** (3) Berman, Gale
Primarily for non-science majors. A comparative study of music and physics, showing parallels in the history of the two fields and emphasizing those topics in physics related to the theory of music and the production of sound by musical instruments, particularly classical mechanics and wave motion. Prerequisite: high school algebra and geometry. Laboratory fee, $50. (Fall)

8 **Origin and Evolution of Ideas in Physics** (3) Bergmann, Harper, Briscoe
Primarily for non-science majors. The evolution of ideas and their historical continuity in the search for basic physical theories. By presenting the world-views of great physicists of the past, the division of physics into many sub-disciplines is avoided and a more humanistic approach is achieved. Prerequisite: high school algebra. Laboratory fee, $50. (Spring)

21 **University Physics I** (3) Khatcheressian
Classical physics using calculus. Mechanics, including Newton's laws of motion, force, gravitation, equilibrium, work and energy, momentum, and rotational motion; periodic motion, waves, and sound; heat and thermodynamics. Prerequisite: Math 31, corequisite: Phys 5 and Math 32. (Fall)

22 **University Physics II** (3) Berman
Classical and modern physics using calculus. Electricity and magnetism, including electrostatics, electromagnetism, direct and alternating current circuits, and electromagnetic radiation; geometrical and physical optics; special relativ-

ity; quantum theory; atomic physics; nuclear physics; particle physics; cosmology. Prerequisite: Phys 21 and Math 32; corequisite: Phys 6. (Spring)

41 **Physics I for Scientists and Engineers** (4) Khatcheressian
Mechanics and waves. Lecture (3 hours), recitation and laboratory (2 hours). Development of basic principles of classical mechanics and wave motion. Topics include Newton's laws, work and energy, conservation of energy and momentum, rigid-body dynamics, periodic motion, waves, sound. Prerequisite: Math 31; corequisite: Math 32. Laboratory fee, $50. (Spring)

42 **Physics II for Scientists and Engineers** (4) Haberzettl
Thermodynamics, and electricity and magnetism. Lecture (3 hours), recitation and laboratory (2 hours). Topics include temperature, heat, the laws of thermodynamics, entropy; Coulomb's and Gauss's laws, electric field and potential, capacitance, electric current, magnetic field, Ampere's and Faraday's laws, alternating-current circuits. Prerequisite: Phys 41. Laboratory fee, $50. (Fall)

43 **Physics III for Scientists and Engineers** (4) Reeves, Parks
Optics and modern physics. Lecture (3 hours), recitation and laboratory (2 hours). Topics include light as an electromagnetic wave, Maxwell's equations, geometric and physical optics, special relativity, quantum mechanics, atomic physics, solid-state physics, nuclear physics, particle physics, astrophysics and cosmology. Prerequisite: Phys 42. Laboratory fee, $50. (Spring)

128 **Biophysics: Physics in the Life Sciences** (3) Reeves, Parks
Physical principles applied to biological systems, medicine, and instrumentation in medicine and biology. Applications include biological transducers, molecular biophysics, bioenergetics, radiation biology, ordering theory, and neural networks. Prerequisite: Phys 1 and 2 or equivalent. (Spring).

151–52 **Intermediate Laboratory** (3–3) Feldman
Independent advanced work to introduce students to research techniques and use of specialized instruments. Laboratory fee, $50. (Fall and spring)

161 **Mechanics I** (3) Reeves
Mechanics of mass points and rigid bodies. Newton's laws, conservation laws, Euler's equations, inertia tensor, small vibrations, and elements of Lagrange's and Hamilton's equations.

162 **Mechanics II** (3) Bergmann
Basic aspect of continua, including elasticity and fluid dynamics, strain tensor, stress tensor, equations of equilibrium, elastic waves, ideal and viscous fluids.

163 **Physical and Quantum Optics** (4) Peverley
Lecture (3 hours), laboratory (3 hours). Wave motion, electromagnetic aspects of light, dispersion of light in media, geometrical optics, polarization and optical properties of crystals, interference, diffraction, lasers, holography. Mathematical tools, including Fourier methods, developed as needed. The quantum description of light complements the classical description. Laboratory fee, $5

164 **Thermodynamics** (3) Staff
Principles and applications of equilibrium thermodynamics, reversible processes, thermodynamic potentials, stability and phase changes

165 **Electromagnetic Theory I** (3) Zuchelli
Development of the Maxwellian field conception, using vector and tensor calculus, stationary and static electric field configurations and polarized media, currents, time-dependent fields and relativistic considerations, the general field-determining relations, and their solutions.

166 **Electromagnetic Theory II** (3) Zuchelli
Stationary magnetic fields and magnetic media, dynamic transfers to and by the fields, radiative processes by isolated charges and by charge configurations, Bremsstrahlung and synchrotron radiation, radiation from antennas, the equation of motion for radiating charges and its solutions, the quantum interface, Bohm–Aharonov and related phenomena.

167 **Principles of Quantum Physics** (3) Briscoe
Development of logical structure and experimental bases for modern quantum mechanics. Simple examples worked out to clarify the structure, primary emphasis on conceptual framework and its mathematical realization; careful consideration of the laboratory results to which the theory is a response.

168 **Applied Quantum Physics** (3) Reeves
Explicit applications of principles of quantum mechanics to a variety of problems in atomic, molecular, and nuclear physics. Quantum statistical mechanics

developed with applications in solid state. Emphasis on explicit evaluation of solutions and the techniques required. Prerequisite: Phys 167 or equivalent

170 **Solid-State Physics** (3) Peverley
Structure of solids, lattices and lattice defects, deformation, vibrational and electronic contribution to specific heats, binding energies, electronic states in metals and semiconductors, magnetic properties of solids, superconductivity. **Prerequisite: Phys 167 or permission of instructor.**

175 **Nuclear Physics (3)** **Berman, Briscoe**
Introduction to application of quantum physics in the description of nuclei and their interactions. Properties of nuclei, nuclear models, nuclear forces, and nuclear reactions are considered. Specific topics include the deuteron, n-p scattering, the optical model, the shell model, the liquid-drop model, beta decay, fission, and fusion. Prerequisite: Phys 167 or permission of the instructor.

181 **Computational Mechanics** (3) Reeves, Dhuga
Topics include harmonic motion, celestial mechanics, chaotic systems, fluid dynamics, and other such complex systems that require a computational approach. Prerequisite: Phys 43, CSci 49 or 50 or equivalent. Laboratory fee, $50.

195–96 **Undergraduate Research** (3–3) Staff
Research on problems approved by the staff. For the B.S. option, emphasis will be placed on advanced laboratory experience. For the B.A. option, the two semesters will involve advanced laboratory experience and applications of computers in the solution of physics problems, respectively. Laboratory fee for Phys 195, $50.

POLITICAL COMMUNICATION

See **Media and Public Affairs.**

POLITICAL SCIENCE

University Professor J.N. Rosenau
Professors B. Reich, Y.C. Kim, J.M. Logsdon, C.A. Linden, H.R. Nau, M.A. East, J.B. Manheim, C. McClintock, P. Reddaway, J.R. Henig (*Chair*), L. Sigelman, M.J. Sodaro, S.L. Wolchik, J.R. Wright, H. Harding, D. Shambaugh
Associate Professors C.F. Elliott, R.W. Rycroft, C.J. Deering, H.B. Feigenbaum, J.H. Lebovic, R.P. Stoker, N.J. Brown, A. Bowie
Assistant Professors S.K. Sell, M. Finnemore, F. Maltzman, B. Dickson, P. Wahlbeck, D. Auerswald, J. Goldgeier, L. Zeng, **D.D. Avant, S.J. Balla, I. Creppell, J. Willson-Quayle**

Bachelor of Arts with a major in political science—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite: PSc 1, 2, and 3 (or the equivalent). Six courses in the social sciences, other than political science, to include 6 hours of history or 6 hours of economics. Twelve credit hours of introductory foreign language and statistics are strongly recommended.
3. Required courses in the major: 30 credit hours of 100-level political science courses, including a distribution requirement that consists of 3 credit hours from each of the following groups: Group A (comparative politics)—PSc 130, 131, 167, 170, 173, 177, 179, 180, 181, 183; Group B (American government and politics)—PSc 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 122, 124, 128, 129; Group C (international politics, law and organizations)—PSc 139, 140, 142, 144, 146, 149, 161, 168, 175, 176, 178, 180, 182, 184; Group D (methodology)—PSc 101, 102, 104; Group E (political thought)—PSc 105, 106, 107, 108, 110.

Every major must complete a proseminar or, if eligible, the Honors Seminar (PSc 199) in the junior or senior year. A maximum of two of these may be included in a student's program; such courses do not satisfy the department's group distribution requirements. A 200-level course may be substituted for the proseminar requirement with the written permission of the instructor and the undergraduate coordinator.

The department also offers a major with a public policy focus. Students who wish to concentrate in public policy must distribute their 30 hours in political science as follows: PSc 104; 9 credit hours in policy-oriented courses to be selected from PSc 112, 117, 122,

124, 146; one policy-oriented proseminar; 3 additional credit hours from each of Groups A, B, C, and E; and 3 credit hours in a political science elective at the 100 level.

No more than 3 hours of service-learning or internship courses may be credited toward the major; these courses do not satisfy the distribution requirement.

Students may apply for graduation with Special Honors. To qualify, the student must fulfill the general requirements stated under University Regulations and take PSc 199 Honors Seminar, in which an independent study project is completed with distinction. The student must complete the seminar before the final semester of course work. The project is evaluated by a Departmental Honors Committee, which can recommend graduation with Special Honors in political science. To be eligible for enrollment in an honors seminar, students must be political science majors, have successfully completed PSc 101, have achieved a grade-point average in the major of at least 3.3, and be juniors or seniors.

Minor in political science—Required: PSc 1, 2, and 3 (or the equivalent) plus 12 credit hours of 100-level political science courses, including a distribution requirement of one course each from Groups D and E. A minimum of 9 credit hours of other social science courses is also required.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: PSc 1 is prerequisite to Group A courses (comparative politics). PSc 2 is prerequisite to Group B courses (American government and politics), and PSc 3 is prerequisite to Group C courses (international politics, law, and organizations). Courses are defined by their group under item 3, above. Elliott School students substitute IAff/PSc 5 for PSc 3 as a prerequisite to Group C courses. Qualified juniors and seniors who are not political science majors and who wish to take 100-level PSc courses without having the appropriate prerequisites may do so only with the written permission of the instructor.

1 **Introduction to Comparative Politics** (3) Sodaro
Concepts and principles of comparative analysis, with an examination of politics and government in selected countries. (Fall and spring)

2 **Introduction to American Politics and Government** (3) Sigelman, Maltzman
Structure, powers, and processes of the American political system and their impact on public policy. (Fall and spring)

3 **Introduction to International Politics** (3) Goldgeier, Nau, Lebovic
Analysis of world politics, focusing on the role of nation–states and international organizations and on selected foreign policy issues.

5 **Introduction to International Affairs: A Washington Perspective** (4) Nau, Ba
Same as IAff 5. For Elliott School freshmen only.

11–12 **Introduction to Political Behavior** (6–6) Willson-Quayle
Role of personal and social values in political behavior. Fall: Focus on problems in the American liberal tradition. Spring: A comparative perspective on democratic and authoritarian governments in the 20th century. Admission by special selection process. (Academic year)

50 **Washington, D.C.: History, Culture, and Politics** (3) Gillette
Same as AmSt/Hist 50.

101 **Scope and Methods of Political Science** (3) Lebovic, Wahlbeck
Nature of political inquiry, approaches to the study of politics and government, empirical methods of research. Laboratory fee, $20. (Fall and spring)

104 **Methods of Public Policy Analysis** (3) Stoker Ba
Introductory overview of the concepts, issues, and techniques of systematic policy analysis and its role in the policy process. (Fall and spring)

105–6 **Major Issues of Western Political Thought** (3–3) Creppell, Linde
PSc 105: foundations of Western political thought—Plato to Aquinas. PSc 106: history of political thought from the 16th through the late 19th century, as set forth in the works of representative thinkers.

107 **20th-Century Political Thought** (3) Creppell, Linde
Recent Western political thought: analysis and critique of the legacies of modern political theories and ideologies. (Spring)

108 **Marxism–Leninism** (3) Elliott
Intensive study of theories and philosophical assumptions of modern communism. Emphasis on Marx, Engels, and Lenin, and consideration of Bernstein, Rosa Luxemburg, Lukacs, Trotsky, Stalin, Khrushchev, and Gorbachev.

110 **American Political Thought** (3) Willson-Quayle
Political thought in the U.S. from colonial times to the present as seen through major representative writings. (Spring)

111 **State and Urban Politics** (3) Henig
Comparative analysis of context, institutions, processes, and policies of state and urban political systems. (Fall)

112 **State and Urban Policy Problems** (3) Henig
Selected issues in state and urban policymaking, with emphasis on urban and metropolitan settings. (Spring)

113 **Judicial Politics** (3) Wahlbeck
An examination of judicial process and behavior. Emphasis on judicial selection, decision making, interaction with the political environment, and impact and implementation of decisions.

114–15 **U.S. Constitutional Law and Politics** (3–3) Wahlbeck
PSc 114: Separation of powers, federal–state relationships, economic regulation. PSc 115: Political and civil rights. (Academic year)

116 **The American Presidency** (3) Maltzman
Examination of the politics of presidential selection, the authority of the contemporary institution, the mechanisms and processes for formulating public policy, and the influences of personality on performance in office. (Fall and spring)

117 **Public Administration and Bureaucratic Politics** (3) Rycroft
Basic concepts in public administration; influence of bureaucratic politics on policy formulation and implementation. Same as PAd 125. (Fall)

118 **Legislative Politics** (3) Deering, Wright, Maltzman
Theory, structure, and process of the U.S. Congress, with emphasis on elections, party organization, committees, and floor procedure, in the context of executive–legislative relations and interest-group activities. (Fall and spring)

119 **U.S. Political Parties and Politics** (3) Wright
Role of parties as a linkage between mass preferences and government policies. Organization, nominations, voting, and activities in legislative and executive branches. (Fall and spring)

120 **Public Opinion and Political Socialization** (3) Staff
Sources of mass political attitudes and behavior: voting and political campaigning. (Fall)

122 **Science, Technology, and Politics** (3) Logsdon, Rycroft
Multiple impacts of scientific and technological developments on the political systems. Discussion of public policies for support, use, and control of science and technology. (Fall and spring)

124 **Issues in Domestic Public Policy** (3) Deering, Stoker, Balla
Examination of the decision-making process and the substance of various issues in domestic public policy in such areas as crime, economics, education, energy, the environment, poverty, and health. (Fall and spring)

128 **Governmental Processes and the News Media** (3) Staff
Same as Jour/PCm 128.

129 **Television and Politics** (3) Staff
Examination of the impact of television on American politics and society, the nature of coverage of political issues and campaigns, the dynamics of selecting and presenting news stories. Same as Jour PCm EMda 129. (Fall and spring)

130 **Comparative Politics of Western Europe** (3) Feigenbaum
Comparative political analysis with primary focus on the principal states of Western Europe. (Fall and spring)

131 **Comparative Politics of Russia and Central/Eastern Europe** (3) Sodaro, Wolchik
Comparative analysis of the Soviet union and its successor states and of central and Eastern Europe, focusing on communism and its collapse and on post-communist developments. (Fall and spring)

139 **International Political Economy** (3) Sell
Analysis of the political aspects of global economic relationships, focusing on such issues as economic hegemony, interdependence, trade relations, devel-

opment assistance, multinational corporations, and the role of international organizations. (Fall and spring)

140 **Theories of International Politics** (3) Nau, Sell, Lebovic, Auerswald Goldgeier, East, Avant, Finnemore
Exploration of alternative theoretical approaches to understanding world politics in its historical and contemporary dimensions. (Fall and spring)

142 **International Organizations** (3) Finnemore
Development and operations of the United Nations, regional organizations, and functional international organizations. (Fall and spring)

144 **The Politics of International Law** (3) Staff
The political sources and consequences of international law and norms. (Fall and spring)

146 **U.S. Foreign Policy** (3) Auerswald
Constitutional, political, and international factors that determine the formulation, execution, and substance of U.S. foreign policy. (Fall and spring)

149 **Military Force and Foreign Policy** (3) Avant
Impact of military considerations on U.S. foreign policy; major problems of national security, e.g., strategic weaponry, military assistance, regional security problems. (Fall and spring)

161 **European–Atlantic Relations** (3) Staff
International politics of the North Atlantic area, the European Common Market, and U.S.–European relations. (Fall)

167 **Human Rights and Soviet Government** (3) Reddaway
Human rights theory, the various movements for human, religious, civil, political, and other rights that emerged in the USSR from the early 1960s, and the ways in which the authorities responded to these movements. These themes are traced into the post-Soviet period. (Fall)

168 **Post-Soviet Foreign Policy** (3) Elliott
External problems and policies of Russia and the other successor states of the former USSR (especially the Baltics, Ukraine, and southern rim of the former Soviet Union). (Fall)

170 **Comparative Politics of China and Northeast Asia** (3) Dickson
Political institutions and processes of China (including Taiwan), Japan, and Korea since World War II. Influence of indigenous traditions and foreign contacts. (Fall)

173 **Comparative Politics of Southeast Asia** (3) Bowie
Comparative analysis of Southeast Asian politics and economics, with principal focus on the capitalist countries of the region. (Fall)

175 **International Relations of East Asia** (3) Kim, Dickson
Analysis of the foreign policies of selected East Asian countries and the foreign policies of major powers toward the region. (Fall)

176 **The Arab–Israeli Conflict** (3) Reich
Origins, evolution, and issues of the Arab–Israeli conflict. (Spring and summer)

177 **Comparative Politics of the Middle East** (3) Reich, Brewer
Politics of the eastern Arab states, Turkey, Iran, and Israel. (Fall)

178 **International Relations of the Middle East** (3) Reich, Brewer
Analysis of the regional and international relations of the Middle East. (Spring)

179 **Israeli Politics and Foreign Policy** (3) Reich
Examination of the institutions, processes, and issues of Israeli politics and foreign policy. (Fall)

180 **Comparative and International Politics of North Africa** (3) Staff
Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan, their relations with states of the Middle East. (Spring)

182 **African International Politics** (3) Staff
Analysis of interstate relations in Africa and of selected aspects of African relations with the outside world. Recommended prerequisite: PSc 181. (Spring)

183 **Comparative Politics of Latin America** (3) McClintock
Political processes and institutions of selected countries in South America, Central America, and the Caribbean. Emphasis on the possibilities for democracy and revolution. (Fall)

184 **International Relations of Latin America** (3) McClintock
U.S.–Latin American relations and foreign policies of selected states. (Spring)

187 **Internship** (1 to 3) Staff
Study of political behavior through internship experience with Congress, executive departments or agencies, politically active private-sector groups, political parties, or electoral campaigns. Admission requires departmental approval. (Fall and spring)

190 **Selected Topics** (3) Staff
(Fall and spring)

191 **Independent Study** (1 to 3) Staff
For departmental majors and minors. Prerequisite: 15 credit hours of 100-level political science courses and approval of the undergraduate program advisor and the faculty member who will direct the study.

192 **Proseminar** (3) Staff
Examination of selected problems in political science. Admission requires departmental approval. (Fall and spring)

199 **Honors Seminar** (3) Staff
Research on selected topics. Admission requires departmental approval. Prerequisite: PSc 101 or 104

PSYCHOLOGY

Professors A.D. Kirsch, D.E. Silber, C.E. Rice, E. Abravanel, I. Miller, L.A. Rothblat, R.A. Peterson, J. Zeidner (*Research*), R.D. Caplan, P. Wirtz, D. Reiss, S.A. Karp, C.K. Sigelman, R.W. Holmstrom (*Chair*), G. Howe (*Research*), L.A. Lefton
Professorial Lecturers J.C. Shari
Associate Professors P.J. Poppen, L. Brandt, L.R. Offermann, C.A. Rohrbeck, M.C. Zea, S. Dopkins, S.D. Molock
Adjunct Associate Professor C. Reisen
Assistant Professors J.M. Ganiban, D. Rohrer, D.P. Costanza, N. Frank, E. Peterson
Adjunct Assistant Professor K. Ross-Kidder
Assistant Professorial Lecturer C.M. Carney
Lecturer P.J. Woodruff

Bachelor of Arts with a major in psychology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite course—Psyc 1.
3. Required courses in related areas.
   (a) Stat 53 or equivalent. Students are encouraged to take a second statistics course to meet the general curriculum requirement in quantitative and/or logical reasoning.
   (b) 6 credit hours from one of the following departments: Anthropology, Economics, History, Political Science, or Sociology; an additional 3 credit hours from any of these departments or from American Studies, Geography, or Philosophy.
4. Required courses in the major—Three survey courses (Psyc 11, 12, 13); 25 credit hours in 100-level psychology courses, including principles and methods of research (Psyc 105 or 106); experimental (Psyc 118 or 121); history and systems (Psyc 196); and five additional 100-level courses. Psyc 196 should be taken during the senior year.

It is recommended that students contact their academic advisors as soon as possible for assistance in planning their programs of study.

To qualify for graduation with Special Honors the student must fulfill the general requirements stated under Regulations, take an honors seminar (Psyc 197) or a 200-level seminar, and complete an independent study project (Psyc 191 or 198) with distinction. The grade-point average in psychology required for graduation with Special Honors is 3.3.

Five-Year Bachelor of Arts/Master of Arts in the field of art therapy—A program leading to the B.A. in the field of fine arts or psychology and the M.A. in the field of art therapy. The first three years of the program consist of undergraduate course work. Application for admission to the M.A. program in art therapy will be made during the second semester of the third year; for admission to the graduate portion of the program, acceptance must be obtained prior to the start of the fourth year of the program. If acceptance to the M.A. program in art therapy is not desired or not obtained, the requirements for the B.A. degree in the undergraduate field chosen may be fulfilled by the successful completion of appropriate courses during the fourth year of study. If acceptance into the M.A. program in art therapy is obtained, the B.A. will be awarded after the successful completion of the fourth year of the program. Study during the summer following the award of the

bachelor's degree and the following academic year would normally complete the M.A degree requirements.

The following requirements must be fulfilled:

1. Students must meet the general requirements stated under Columbian School of Arts and Sciences. (See the Graduate Programs Bulletin also.)

2. The course requirements for the B.A. in either fine arts or psychology and for the M.A. in art therapy must be met.

Minor in psychology—18 credit hours are required, including Psyc 1, 11, 12, 13, and at least two 100-level psychology courses. Students considering graduate study in psychology are advised to take Psyc 105 or 106, a distribution of courses from the categories listed under the major above, Psyc 196, and an elementary course in statistics.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: Psyc 1 is prerequisite to all psychology courses.

1 **General Psychology** (3) Staff
Fundamental principles underlying human behavior. (Fall and spring)

11 **Abnormal Psychology** (3) Rohrbeck, Zea, Woodruff, Frank
Causes, diagnosis, treatment, and theories of various types of maladjustments and mental disorders. (Fall and spring)

12 **Social Psychology** (3) E. Peterson, Poppen
Social foundations of behavior: cognition, motivation, role behavior, communication, small-group processes, and attitudes. (Fall and spring)

13 **Developmental Psychology** (3) Brandt, Ganiban
Introduction to the study of human development; theory and research concerning changes in physical, cognitive, and social functioning and influences on the developing individual.

104 **Ecology and Mental Health** (3) Karp
Examination by field research of the linkages between aspects of the physical environment and mental health. Tutorials, conferences, and student field research projects. (Fall)

105–6 **Principles and Methods of Psychology** (4–4) Dopkins, Rohrer
Lecture (3 hours), laboratory (3 hours). An experimental approach to understanding behavior; individual and class experiments performed. Psyc 105: sensation, perception, and emotions and their relation to adaptive behavior. Psyc 106: memory, human information processing, learning, and motivation. Laboratory fee, $30 per semester. (Academic year)

108 **Humanistic Psychology** (3) Staff
Critical examination of humanistic psychology. Emphasis on role of consciousness in human behavior. Philosophic foundations, existential, phenomenological, and transpersonal psychology. (Fall)

110 **Perception and Understanding in Children** (3) Abravanel
Concepts and research in the area of developmental psychology; emphasis on the growth and development of thinking, perceiving, and symbolic activity. (Spring)

112 **Psychology of Adolescence** (3) Ross-Kidder
Psychological characteristics and problems peculiar to adolescence, with emphasis on application of psychology to solution of such problems. (Fa or spring)

114 **Adult Development and Aging** (3) Staff
Psychological aging and development during the adult years, with an emphasis on theories of adult development and research on changes in cognitive functioning and social adjustment in early, middle, and later adulthood. Prerequisite: Psyc 13.

118 **Neuropsychology** (3) Rothblat
Analysis of neural processes underlying behavior. Basic structure and functions of the nervous system, with emphasis on sensory processes, learning and memory, motivation, and emotion. (Fall and spring)

119 **Group Dynamics** (3) Staff
Relationship of the individual to groups, collectivities, and larger social systems. Theory, research, and applications of group and organizational processes, emphasizing contributions of Freud, Bion, Slater, Miller and Rice. Opportu

is provided to attend a group dynamics workshop, which is recommended but not required. Enrollment limited. (Spring)

121 **Memory and Cognition** (3) Rohrer
An examination of the psychological processes underlying human memory and cognition. Topics cover theoretical and experimental issues involving a range of cognitive function from attention and pattern recognition to learning and memory. (Fall)

125 **Cross-Cultural Psychology** (3) Zea
Introduction to the theory, methods, and research of cross-cultural psychology, with emphasis on immigrants and ethnic minorities in the United States and on other cultures. Prerequisite: Psyc 12 or 13. (Spring)

128 **Health Psychology** (3) R. Peterson, Poppen
Current research in the area of health psychology, with special attention to psychological factors related to health and illness, psychological intervention with medical patients, and psychological approaches to illness prevention and health promotion. (Fall and spring)

129 **Theories of Personality** (3) Poppen, Rice
Survey of personality theories; emphasis on their application to problems of individuals. (Fall and spring)

131 **Psychological Tests** (3) Karp
Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $25. (Fall and spring)

132 **Socialization in Childhood** (3) Brandt, Ganiban
Examination of primary methods by which the child is shaped in terms of social judgment and self-control: internalization of controls, assimilation of societal values and parenting procedures. Organized by focus on issues according to developmental level.

135 **Freud and Modern Psychoanalysis** (3) Staff
Introduction to the work of Freud and his impact on modern psychoanalysis, focusing on the meaning of dreams and the unconscious function of conflict and defense, infantile sexuality and the Oedipus conflict, development of the ego, theory of anxiety and neurosis, and the death instinct. (Spring)

144 **Industrial/Organizational Psychology** (3) Offermann, Caplan
Psychological concepts and methods applied to problems of personnel management, employee motivation and productivity, supervisory leadership, and organizational development. (Fall and spring)

150 **Psychology of Sex Differences** (3) Poppen
Relevant biological, psychological, and sociological influences on males and females in the development of sex differences; hormonal differences, gender identity, differential socialization of sons and daughters, masculinity-femininity, cultural evaluation of male and female roles. Survey of relevant psychological theory. Emphasis on empirical research and hypothesis testing. (Spring)

154 **Psychology of Crime and Violence** (3) Silber
Examination of many psychological aspects of criminal behavior; personality of criminals and of psychological processes affecting behavior. (Spring)

156 **Psychology of Attitudes and Public Opinion** (3) Carney
Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare.

170 **Clinical Psychology** (3) Zea, R. Peterson
An exploration of the history, functions, and problems of the clinical psychologist. Assessment, treatment, community approaches, ethics. Prerequisite: Psyc 11, 131.

188 **Attitudes Toward Death and Dying** (3) Woodruff
Exploration of the many different aspects, attitudes, and experiences associated with the process of death and dying.

191 **Independent Research** (3) Staff
Opportunity for work on individual library or experimental projects. Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. May be repeated once for credit. (Fall and spring)

192 **Field Experience (3)** Abravanel
Senior psychology majors will spend a minimum of six hours a week in a local mental health, rehabilitation, school, or community setting. Students registering for this course must have weekly blocks of time available in their class schedules. (Fall and spring)

193 **Seminar in Industrial/Organizational Psychology (3)** Staff
Selected specialized topics in the field of psychology and work behavior, such as human ability and personality, decisions and risk behavior, organizational change, and leadership. May be repeated for credit. Prerequisite: Psyc 144 or permission of instructor

196 **History and Systems of Psychology (3)** Rice
Senior capstone course that includes a survey and integration of the major viewpoints and concepts of psychology. Required of psychology majors. (Fall and spring)

197 **Honors Seminar (3)** Staff
Selected topics in psychology that change from semester to semester. Intended primarily for juniors who plan to enroll in Psyc 191 in the senior year and for students in the Special Honors program in psychology. May be repeated for credit. (Fall and spring)

198 **Current Research Issues (3)** Staff
Conducted as a seminar. Recent experiments in psychology, including those performed by members of the class; emphasis on student participation. May be repeated for credit.

PUBLIC ADMINISTRATION

Programs in public administration are offered at the graduate level by the School of Business and Public Management. The course listed here is open to interested undergraduates.

125 **Managing Public Policy (3)** Staff
Contemporary concepts and issues in public administration and management. Major trends and approaches to governmental administration in the U.S., including the changing federal role, roles of the public sector in relation to the private sector, and managing public agencies at all levels. Same as PSc 117. (Fall and spring)

RADIOLOGIC SCIENCES

Information on the Bachelor of Science in Health Sciences in the field of radiologic sciences is available from the School of Medicine and Health Sciences.

RELIGION

University Professor S.H. Nasr
Professors H.E. Yeide, Jr., D.D. Wallace, Jr., A.J. Hiltebeitel
Associate Professors P.B. Duff (*Chair*), R.J. Eisen

Bachelor of Arts with a major in religion—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Rel 1, 2.
3. Required courses in the major—30 credit hours, including at least 21 hours of upper-level courses. Twelve of these hours must be chosen from one of the following religious traditions: Christianity, Hinduism, Islam, and Judaism. Appropriate graduate seminars may be approved as substitutions for advanced-level courses. The program must include Rel 101 and at least one course each in Hebrew Scriptures and in New Testament.

Special Honors are awarded to students who meet the requirements stated under University Regulations and who complete an honors thesis by enrolling in Rel 191.

It is recommended that students include the study of foreign languages in their undergraduate program, including a language crucial to one of the religious traditions. All students expecting to enter graduate school are urged to study French or German.

Minor in religion—Required: a minimum of 18 credit hours in religion, of which at least 6 must be upper-level courses. The minor program will be developed in consul-

tion with the departmental advisor. Rel 101 is strongly recommended for all participating students.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

1 **Introduction to World Religions: West** (3) Staff
Examination of the religions of the ancient Mediterranean and the major religions of the West. Religious foundations of Western civilizations. The development of Judaism, Christianity, and Islam and their confrontations with secularization and political upheaval in the modern world. (Fall and spring)

2 **Introduction to World Religions: East** (3) Staff
Examination of the major religions of the East and comparison with religions in the West. Approaches to the cross-cultural study of religion. Hinduism, Buddhism, and the religions of Tibet, China, and Japan are studied with respect to their history and their encounter with modernity. (Fall and spring)

9 **Bible: Hebrew Scriptures** (3) Duff
The literature, history, and religious thought represented by the Hebrew Scriptures (Old Testament). Continuities and contrasts between Israel and the ancient Near East are considered through study of the world view, oral and literary tradition, main religious ideas, and chief figures and movements of the biblical literature. (Fall and spring)

10 **Bible: New Testament** (3) Duff
Literature and history of earliest Christianity in the setting of the religious movements of the Greco-Roman world and developments within Judaism. The meaning of the earliest Christian proclamation about the significance of the life, teaching, and death of Jesus of Nazareth becomes the basis for tracing the formation and expansion of the Christian movement. (Fall and spring)

23 **Introduction to Judaism** (3) Eisen
A survey of Jewish thought and practice from the biblical to the modern period: introduction to the Hebrew Bible, rabbinic Judaism, Jewish philosophy and mysticism, Judaism in the modern period, an examination of the central rituals in Judaism, including Sabbath, dietary laws, and major festivals. (Fall)

101 **Theories in the Study of Religion** (3) Yelde
Seminar taught jointly by the faculty of the Department of Religion. Analysis of different ways in which religious phenomena can be approached. Readings and discussion of some of the epoch-making books in the development of the study of religion. (Fall)

104 **Jesus** (3) Duff
Comprehensive study of the life and teachings of Jesus with critical attention to sources. Quest for the historical Jesus.

105 **Paul** (3) Duff
Backgrounds of early Christianity, first-century religious and social conditions affecting the spread of Christianity, the life and journeys of Paul, Paul's presentation of the Christian faith.

107 **Rabbinic Thought and Literature** (3) Eisen
An examination of the thought and literature of rabbinic Judaism in its formative period, 100–500 CE, through a close reading of primary texts in translation. The development of early rabbinic law and theology is explored in the Mishnah, Talmud, and Midrash.

111 **Myth, Epic, and Novel** (3) Hiltebeitel
Religious themes and images of the hero and their cultural significance in literature, e.g., Indo-European, Biblical, Babylonian narrative traditions, Greek epic and drama, Dante, Milton, Dostoevsky, Kafka, Hesse, Faulkner, Beckett.

112 **Jewish Mysticism** (3) Eisen
A historical treatment of the major forms of Jewish mysticism, the ecstatic schools of Merkavah mysticism, medieval German pietism, and Abraham Abulafia, the theosophic mysticism of medieval French and Spanish Kabbalah, Lurianic Kabbalah, and modern Hasidism, examination of major concepts, such as God, man, Israel, Torah, and redemption, as understood by these schools.

113 **Second Temple Judaism** (3) Duff
History of Judaism from the time of Ezra through the destruction of Jerusalem in 70 CE—canonization of the Pentateuch, Hellenism, Maccabean revolt, growth of sectarian movements, Herod, ferment against Rome in context of Eastern

and Western political currents. Use of primary sources, especially the Bible, Josephus, and rabbinic and noncanonical writings.

115 **Jewish Philosophy in the Medieval Period** (3) Eisen
An exploration of Jewish philosophical thinking from the close of the rabbinic period to the end of the Middle Ages through an analysis of four major philosophers—Saadiah, Judah Halevi, Maimonides, and Gersonides. Topics include the nature of God, creation, divine providence, prophecy, and the rationale for the biblical commandments.

116 **Modern Jewish Thought** (3) Eisen
Transformation of community and beliefs among Jews beginning with catalysts of their political emancipation. Responses to beginnings of modernity among Jews in Europe, America, and Israel.

121 **Ethics and the World Religions** (3) Yeide
Modern concepts of ethics and their relation to major world religions; religion as stimulus and barrier to moral change; modern moral issues and religious ethics.

122 **Christian Ethics and Modern Society** (3) Yeide
Nature and principles of Christian life as developed by the Christian community; problems of personal conduct; application to various social institutions.

123 **Issues in Jewish Ethics** (3) Eisen
Exploration of current debates about major ethical issues among Jewish thinkers in the Orthodox, Conservative, and Reform denominations: issues in bioethics, feminism, attitudes towards non-Jews, social action, the ethics of war.

124 **Contemporary Movements in Theology** (3) Staff
Theological approach and systems of a selected number of modern theologians and/or theological movements such as process theology, liberation theology.

134 **The Holocaust in Theology and Literature** (3) Eisen, Ticktin
Theological and literary reactions of Jewish thinkers to the Holocaust; emphasis on evaluating contemporary responses to the Holocaust in light of attitudes toward suffering in the classical Jewish tradition; readings include Fackenheim, Rubinstein, Wiesel, and Appelfeld.

143 **Christianity in the Ancient World** (3) Wallace
Rise and development of Christianity in relation to the culture, philosophy, mystery religions, and general religious life of the Greco-Roman world to A.D. 500.

144 **Medieval Faith and Symbolism** (3) Wallace
Christian life and thought in the Middle Ages; mystics, saints, popes, and philosophers.

145 **Religion in the Renaissance and Reformation** (3) Wallace
Transformation of the Western understanding of human identity and destiny from the end of the Middle Ages to the Age of Reason.

146 **Christianity in the Modern World** (3) Wallace
Changes in Christian life and thought since 1700, as seen in theology, literature, political life, and religious institutions.

155 **Religion, Myth, and Magic** (3) Staff
Same as Anth 155.

157 **Indian Philosophy and Mysticism** (3) Hiltebeitel
Indian speculative and mystical traditions; late *Vedas*, *Upanishads*, *Bhagavad Gita*, Buddhist, and Hindu soteriological systems.

158 **Hinduism** (3) Hiltebeitel
Study of continuity and change in Hinduism, with emphasis on historical development and the consolidating features of the religion. Attention to relations between classical and popular living forms.

159 **Mythologies of India** (3) Hiltebeitel
The lore of Indian gods (Vedic, Puranic), heroes (epics), and holy men (Hindu, Buddhist, Jain, Tantric), ties with Indian art, caste, cult, cosmology, and spiritual ideals.

160 **Buddhism** (3) Hiltebeitel
Origin, development, and contemporary status of Buddhist life and thought; its impact on Asia.

161 **Islam** (3) Nasr
Origin, development, and contemporary status of Islamic life and thought; its impact on the Near East.

163 **Islamic Religion and Art** (3) Nasr
Investigation of major forms of Islamic art, such as calligraphy, architecture, and urban design; Quranic chanting, poetry, and music in relation to the principles of Islamic revelation. Same as Art 119

164 **Islamic Philosophy and Theology** (3) Nasr
The major schools of Islamic philosophy and theology, considered in both a morphological and historical manner. The relation between revelation and reason, determination and free will, and divine and human knowledge as well as the relation among science, philosophy, and religion. The development of various schools of thought, from the classical period to the present.

165 **Sufism (Islamic Mysticism)** (3) Nasr
The foundation of Sufism in the Quranic revelation, its subsequent development, and its significance within Islamic civilization. Doctrines and practices of Sufism; history of the Sufi orders; Sufi literature, particularly in Arabic and Persian. The influence of Sufism upon social and political life and its state and role in the contemporary world, both Islamic and non-Islamic.

172 **Religion in American Culture** (3) Wallace
Growth of religious groups and institutions in relation to American culture, development of religious thought, and analysis of the contemporary religious scene.

174 **American Judaism** (3) Eisen
Religious thought and institutions with emphasis on contemporary Judaism. Mythic and ritual life of American Jews, including responses to Israel, diaspora, the Holocaust, family and community dynamics.

181 **Women in Western Religion** (3) Staff
Historical, theological, and ethical investigation of the image and role of women in Judaism and Christianity; special consideration of the Biblical experience, the sexual qualifications for religious office, use of male and female images and languages, and contemporary issues. Same as WStu 181.

190 **Selected Topics** (3) Staff
Critical examination of religious phenomena rendered timely by current events or special resources. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

191 **Senior Honors Thesis** (3) Staff
Required of and open only to undergraduate honors candidates in religion. (Fall and spring)

ROMANCE LANGUAGES AND LITERATURES

Professors J.F. Burks, I. Azar (*Chair*), J.F. Thibault, G. Ludlow
Associate Professors G.P. Huvé, Y. Captain, J.A. Quiroga, I.R. Vergara, J.J. Hampton
Assistant Professors E. Echeverria, C.A. Jolivet, K. Smith
Instructor M. Ferretti

Bachelor of Arts with a major in French language and literature, Spanish language and literature, or Spanish American literature—The following requirements must be fulfilled.

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Fren/Span 1, 2, 3, 4, 8 or 9, 10, 30, or equivalent.
3. Required for the majors—Fren 53, 54, and 90; or Span 53, 54, and 90; or Span 55, 56, and 90; plus a minimum of 15 credit hours of 100-level courses, of which at least 9 hours must be in literature. In addition, a proseminar (Fren/Span 199–200) is required. The student is expected to demonstrate a knowledge of his or her field in breadth and depth by passing a comprehensive examination at the end of the senior year.

Minor in French or Hispanic languages and literatures—Required: 9 credit hours chosen from Fren or Span 30, 53, 54, 90 and Span 55, 56; 12 additional hours selected from among French or Spanish courses numbered 8 and above, including at least 6 credit hours of 100-level courses.

Minor in Italian language and literature—Required: 21 credit hours consisting of Ital 9, 10, 30, 53, 54, 120, 131.

Placement Examinations: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

FRENCH

Departmental prerequisite: Fren 4 or equivalent is prerequisite to all courses in French from Fren 8 and above.

1 **Basic French I** (4) Jolivet and Staff
First-semester French. Pronunciation, conversation, reading, composition grammar. Laboratory fee, $50. (Fall, spring, and summer)

2 **Basic French II** (4) Jolivet and Staff
Second-semester French. Emphasis on communication, composition, and reading. Prerequisite: Fren 1 or equivalent. Laboratory fee, $50. (Fall, spring, and summer)

3 **Intermediate French** (3) Jolivet and Staff
Third-semester language study. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Fren 2 or equivalent. Laboratory fee, $50. (Fall, spring, and summer)

4 **Language and Culture** (3) Jolivet and Staff
Fourth-semester language study. History, geography, and culture of France, with emphasis on conversation and composition. Prerequisite: Fren 3 or equivalent. Laboratory fee, $50. (Fall, spring, and summer)

8 **The Language of Business, Commerce, and Management** (3) Huvé
Fifth-semester language study; refining of general linguistic competence; introduction to French economic life; the language of business and finance. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Fren 4 or equivalent. Students who receive credit for Fren 8 cannot receive credit for Fren 9. Laboratory fee, $50. (Fall)

9 **Contemporary Institutions** (3) Huvé and Staff
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Fren 4. Students who receive credit for Fren 9 cannot receive credit for Fren 8. Laboratory fee, $50. (Fall, spring, and summer)

10 **Press, Communication, and Politics** (3) Huvé and Staff
Sixth-semester language study utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of France and the Francophone world. Prerequisite: Fren 8 or 9. Laboratory fee, $50. (Fall, spring, and summer)

20 **French Pronunciation** (3) Huvé
The sounds of French. Oral readings, presentations, recitation. Poetry, scenes from plays. Emphasis on phonetics and diction, with attention to accent, rhythm, and intonation. Prerequisite: Fren 10. Laboratory fee, $50. (Spring)

30 **General Readings in French Literature** (3) Thibault, Smith, and Staff
Readings in prose, poetry, and drama. Introduction to techniques of textual criticism; attention to linguistic and stylistic difficulties in textual analysis. Prerequisite: Fren 10. (Fall and spring)

49 **French for Graduate Students** (0) Staff
For graduate students preparing for reading examinations. No academic credit. Tuition is charged at the rate of 3 credit hours. (Fall, spring, and summer)

53 **History of French Literature from the Middle Ages Through the 17th Century** (3) Smith and Staff
Lecture and discussion in French. Development of genre and movements. Selected readings across these periods plus the reading of complete texts of epics, essays, novels, and plays. Prerequisite: Fren 30 or equivalent. (Fall)

54 **History of French Literature from the 18th Through the 20th Century** (3) Smith and Staff
Lecture and discussion in French. Philosophical and literary movements of the modern period. Selected readings across the period plus the reading of complete texts of novels and drama. Prerequisite: Fren 30 or equivalent. (Spring)

90 **Textual Analysis** (3) Thibault and Staff
Methodology and vocabulary of literary criticism. Application of various principles of textual analysis and critical approaches to literature. Prerequisite: Fren 30 or equivalent. (Spring)

108 **Advanced French Grammar and Style** (3) Thibault and Staff
Composition, drills, dictations. Translations into French. Study of vocabulary and syntax, with emphasis on stylistic devices. Prerequisite: Fren 10. (Fall)

109 **Contemporary France** (3) Huvé and Staff
Emphasis on advanced oral work. Discussion of French culture and civilization, based on contemporary writings and video documents. Prerequisite: Fren 10. Laboratory fee, $50. (Fall)

110 **Business and Commercial French** (3) Huvé
Structure and language of French economic institutions. Discussion of legal, financial, and administrative documents. Oral and written reports. Preparation for the certificate of the Paris Chamber of Commerce. Prerequisite: Fren 10. (Spring)

120 **Studies in Medieval French Literature** (3) Staff
Readings and analysis of the major literary texts from the 11th through 15th centuries. *Chansons de geste*, courtly literature, fabliaux, drama, lyric and didactic poetry.

121 **French Literature of the Renaissance** (3) Staff
The development and maturation of humanistic ideals in France during the 16th century. Rabelais, Montaigne, and La Pleiade.

122 **The Age of Classicism** (3) Ludlow and Staff
Drama, philosophy, criticism, poetry, and fiction of the 17th century. Study of major social, political, and religious movements: *preciosite*, Baroque, Jansenism, rationalism.

123 **The Age of Enlightenment** (3) Ludlow
Study of major novelists, dramatists, *philosophes*, and ideologues of the 18th century. The influence of the works of Montesquieu, Voltaire, Diderot, and Rousseau on European and American thought of the period.

124 **19th-Century French Literature** (3) Thibault, Smith
Study of the major literary movements of the 19th century from romanticism to symbolism. Emphasis on stylistic analysis of major poems, novels, and dramas.

125 **Studies in 20th-Century French Literature** (3) Thibault
The major literary movements of the 20th century: avant-garde, surrealism, existentialism, *nouveau roman*, and *nouveau theatre*.

130 **French Poetry** (3) Thibault
An examination of the creation and evolution of poetic genres. Textual analysis of major French poets.

131 **Narratives in French** (3) Ludlow
Study of the various traditions in the novel, from its medieval origins to the present.

132 **French Classical Dramatic Tradition** (3) Staff
Study of major dramatic genre. Medieval forms, classic tragedy and comedy; Romantic drama and melodrama, *fin de siecle*; contemporary theatre.

133–34 **Special Topics in French Literature** (3–3) Staff
May be repeated for credit provided the topic differs.

197 **Independent Study** (arr.) Staff
Admission by permission of department chair and instructor. May be repeated for credit.

199–200 **Proseminar** (3–3) Thibault
Required of all majors; preparation for the major field examination. Conferences, group discussion, practicum: literature in relation to the other arts and the social sciences. Fren 199: textual analysis, literary criticism, theory, and methods. Fren 200: the concepts of literary history and the history of French literature; periods, authors, genres, topics. (Academic year)

ITALIAN

1 **Basic Italian I** (4) Ferretti and Staff
First-semester Italian. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, $50. (Fall, spring, and summer)

2 **Basic Italian II** (4) Ferretti and Staff
Second-semester Italian. Emphasis on communication, composition, and reading. Prerequisite: Ital 1 or equivalent. Laboratory fee, $50. (Fall, spring, and summer)

3 **Intermediate Italian** (3) Ferretti and Staff
Third-semester Italian. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Ital 2 or equivalent. Laboratory fee, $50. (Fall)

4 Language and Culture (3) Ferretti and Staff
Fourth-semester language study. History, geography, and culture of Italy, with emphasis on conversation and composition. Prerequisite: Ital 3 or equivalent. Laboratory fee, $50. (Spring)

9 Contemporary Institutions (3) Ferretti and Staff
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Ital 4. Laboratory fee, $50.

10 Press, Communication, and Politics (3) Ferretti and Staff
Sixth-semester language study, utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of Italy. Prerequisite: Ital 9. Laboratory fee, $50.

30 General Readings in Italian Literature (3) Ferretti
Readings in prose, poetry and drama. Introduction to techniques of textual criticism; attention to linguistic and stylistic difficulties in textual analysis. Prerequisite: Ital 10. (Fall)

53 History of Italian Literature from the Middle Ages Through the 17th Century (3) Ferretti
Lecture and discussion in Italian. Development of genre and movements. Selected readings across these periods plus reading of complete texts of epics, essays, novels, and plays. Prerequisite: Ital 10 or equivalent. (Fall)

54 History of Italian Literature from the 18th Through the 20th Century (3) Ferretti
Lecture and discussion in Italian. Philosophical and literary movements of the modern period. Selected readings across the period plus the reading of complete texts of novels and drama. Prerequisite: Ital 10 or equivalent. (Spring)

120 Studies in Medieval and Early Renaissance Literature (3) Ferretti
Works by Dante, Petrarca, and Boccaccio. Emphasis on structure, rhetorical features, and problems of narrative organization. Specific attention to historical and ideological aspects of the works as well as to cultural influence.

131 The Italian Novel (3) Ferretti and Staff
A reading of the most important Italian novelists of the 19th and the 20th centuries: Manzoni, Verga, Bassani, Calvino. Study of the relations of each work to its social and cultural context and to the novel as a genre.

197 Independent Study (arr.) Staff
Admission by permission of department chair and instructor. May be repeated for credit.

SPANISH

Departmental prerequisite: Span 4 or equivalent is prerequisite to all courses in Spanish, from Span 8 and above.

1 Basic Spanish I (4) Echeverria and Staff
First-semester Spanish. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, $50. (Fall, spring, and summer)

2 Basic Spanish II (4) Echeverria and Staff
Second-semester Spanish. Emphasis on communication, composition, and reading. Prerequisite: Span 1 or equivalent. Laboratory fee, $50. (Fall, spring, and summer)

3 Intermediate Spanish (3) Echeverria and Staff
Third-semester Spanish. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Span 2 or equivalent. Laboratory fee, $50. (Fall, spring, and summer)

4 Language and Culture (3) Echeverria and Staff
Fourth-semester language study. History, geography, and culture of Spain, with emphasis on conversation and composition. Prerequisite: Span 3 or equivalent. Laboratory fee, $50. (Fall, spring, and summer)

8 The Language of Business, Commerce, and Management (3) Staff
Fifth-semester language study, refining of general linguistic competence, introduction to the economic life of Latin America and Spain, the language of business and finance. Emphasis on oral presentation, stressing communica-

skills. Prerequisite: Span 4 or equivalent. Students who receive credit for Span 8 cannot receive credit for Span 9. Laboratory fee, $50. (Fall)

9 **Contemporary Institutions** (3) Echeverria and Staff
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Span 4. Students who receive credit for Span 9 cannot receive credit for Span 8. Laboratory fee, $50. (Fall, spring, and summer)

10 **Press, Communication, and Politics** (3) Echeverria and Staff
Sixth-semester language study utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of Spain and Spanish America. Prerequisite: Span 8 or 9. Laboratory fee, $50. (Fall, spring, and summer)

30 **General Readings in Spanish Literature** (3) Echeverria and Staff
Readings in prose, poetry, and drama. Introduction to techniques of textual criticism; attention to linguistic and stylistic difficulties in textual analysis. Prerequisite: Span 10. (Fall and spring)

49 **Spanish for Graduate Students** (0) Staff
For graduate students preparing for reading examinations. No academic credit. Tuition is charged at the rate of 3 credit hours. (Fall, spring, and summer)

53 **History of Spanish Literature from the Middle Ages Through the Siglo de Oro** (3) Hampton and Staff
Lecture and discussion in Spanish. Development of genre and movements. Selected readings across the period plus the reading of complete texts of epics, essays, novels, and drama. Prerequisite: Span 30 or equivalent.

54 **History of Spanish Literature from the 18th Through the 20th Century** (3) Hampton and Staff
Lecture and discussion in Spanish. Philosophical and literary movements of the modern period. Selected readings across the period plus the reading of complete texts of novels and drama. Prerequisite: Span 30 or equivalent. (Spring)

55 **History of Spanish-American Literature from the Conquest Through Romanticism** (3) Captain, Quiroga
Lecture and discussion in Spanish. A survey course that covers all genres and focuses on major trends and issues. Prerequisite: Span 30 or equivalent. (Fall)

56 **History of Spanish-American Literature from Modernism to the Present** (3) Quiroga, Captain
A survey course that covers all genres and focuses on major trends and issues. Prerequisite: Span 30 or equivalent. (Spring)

80 **Madrid Study Center: Language and Culture** (3)
Offered through the Madrid Program. May be repeated for credit.

90 **Textual Analysis** (3) Staff
Methodology and vocabulary of literary criticism. Application of various principles of textual analysis and critical approaches to literature. Prerequisite: Span 30 or equivalent. (Spring)

108 **Advanced Spanish Grammar and Style** (3) Staff
Composition, drills, dictations. Translations into Spanish. Study of vocabulary and syntax, with emphasis on stylistic devices. Prerequisite: Span 10. (Fall)

109 **Contemporary Spain and Latin America** (3) Vergara
Emphasis on advanced oral work. Discussion of Hispanic culture and civilization, based on contemporary writings and video documents. Laboratory fee, $50. Prerequisite: Span 10. (Fall)

110 **Business and Commercial Spanish** (3) Staff
Structure and language of Latin American and Spanish economic institutions. Discussion of legal, financial, and administrative documents. Oral and written reports. Prerequisite: Span 10. (Spring)

120 **Studies in Medieval Spanish Literature** (3) Azar
Reading and analysis of the major literary texts from the 11th through the 15th century. Attention paid to linguistic aspects of Old Spanish.

121 **Studies in Golden Age Literature** (3) Azar
Reading and analysis of the major texts of the 16th and 17th centuries. Lyric poetry and the "invention" of subjectivity. Prose fiction and the structure of life. Golden Age *Comedia* and the relation between private and public life. Humanism and the Classical Tradition. The invention of the press, the status of writing, and the new culture of the book. The (post)modernity of Golden Age literature.

122–23 **Cervantes' Don Quijote and the Rise of the Novel** (3) Azar
The novel as a genre. Literature as an institution: Western literary tradition constructed and deconstructed. The structure of narrative and the question of truth. Literature and life.

124 **18th- and 19th-Century Spanish Literature** (3) Staff
Readings in major 18th- and 19th-century texts. Romanticism, *Costumbrismo*, realism, naturalism.

125 **Contemporary Spanish Literature** (3) Staff
Prose, poetry, and drama of the 20th century. Generations of 1898, of 1927, the novel after the Spanish Civil War.

130 **Poetry of Spain and Latin America** (3) Quiroga
Major classical and modern poetic traditions and genres. Textual analysis of major Spanish works.

131 **Narratives of the Hispanic World** (3) Vergara
Emphasis on the novel and short story.

132 **Theatre and the Hispanic Experience** (3) Azar, Vergara
Study of major dramatic traditions in Spain and Spanish America. Emphasis on the *commedia*.

133–34 **Special Topics in Spanish and Spanish-American Literature** (3–3) Staff
May be repeated for credit provided the topic differs.

140 **Latin American Women Writers** (3) Vergara
Works of well-established women writers (such as Sor Juana Ines de la Cruz, Gabriella Mistral, and Luisa Valenzuela) and those of more recent writers (such as Elena Poniatowska, Diamela Eltit, Ana Lydia Vega, Cristina Peri-Rossi, and Laura Esquivel) are discussed in relationship to feminist principles of criticism.

145 **Modern Spanish-American Poetry** (3) Quiroga
Poetry after Modernism; the various metric patterns that characterize the work of authors such as Agustini, Mistral, Huidobro, Villaurrutia, Vallejo, Borges, Neruda, Parra, Cardenal, Guillén, Lezama, and Palés.

146 **Spanish-American Short Fiction** (3) Captain, Vergara
Analysis of short stories and short novels by writers such as Quiroga, Rulfo, Fuentes, Cortázar, Zapata Olivella, Arenas, and Borges.

147 **Spanish-American Polemics** (3) Quiroga, Captain
Origin and development of writing in Spanish America and its relationship to the creation of national or nationalist discourse. Readings include excerpts concerning the New World and its inhabitants, the question of independence (cultural and economic), and the discourse for and against slavery. The focus is on the 19th century and the essay.

148 **New Narrative in Spanish America** (3) Captain, Vergara
A study of experimental fiction in Spanish America, with a focus on the literature of the mid-1960s through the 1970s. Precursors of and successors to the new narrative.

149 **Spanish-American Colonial Literature** (3) Quiroga, Captain
Focus on the literature written before independence, with an incursion into Spanish Medieval and Renaissance literature.

150 **Spanish-American Romanticism and Modernism** (3) Quiroga, Vergara
Key writers and trends that characterize Romanticism and Modernism. Readings include works from the period of the French and American Revolutions: Andrés, Sarmiento, Olmedo, Heredia, Darío, Martí, and Lugones.

180 **Madrid Study Center: Advanced Language, Culture, and Literature** (3) Staff
Offered through the Madrid Program. Topics vary. May be repeated for credit.

197 **Independent Study** (arr.)
Admission by permission of department chair and instructor. May be repeated for credit.

199–200 **Proseminar** (3–3) Vergara
Required of all majors; preparation for the major field examination. Conferences, group discussion, practicum; literature in relation to the other arts and the social sciences. Span 199: textual analysis, literary criticism, theory, and methods. Span 200: the concepts of literary history and the history of Spanish literature; periods, authors, genres, topics. (Academic year)

SERVICE–LEARNING PROGRAM

152 Issues in Human Services (1 to 6) Nashman
An inquiry into the values and methods of practitioners in the field of human services, linking academic study and field experience. Admission by permission of instructor. (Fall and spring)

154 Independent Study (1 to 6) Staff
Fieldwork combined with academic study, involving field placements and complementary academic program of study, under the supervision of an appropriate faculty member. Students must contract with the agency, the faculty member, and the Service–Learning Program. Graded on a Pass No Pass basis only. Admission by permission of director. (Fall and spring)

700 SERIES

The 700 Series is made up of experimental or special courses that are on the cutting edge of the academic endeavor. Often, courses in the 700 Series focus on interdisciplinary or very current issues in a field. Because 700 Series courses change each semester, students should consult the *Schedule of Classes* for offerings. Courses are listed with the participating departments; course descriptions appear in a specially designated section of the Schedule.

Courses numbered 701 are in general studies, 721 courses are interdepartmental, 751 courses are interschool, and 770s and 780s are taught by University Professors and are listed in this Bulletin under the designation of University Professors. The program is coordinated by the Director of Summer, Special, and International Programs.

SLAVIC LANGUAGES AND LITERATURES

See **German and Slavic Languages and Literatures.**

SOCIOLOGY

University Professor A. Etzioni
Professors R.W. Stephens, T.F. Courtless, Jr., P.H.M. Lengermann (*Research*), R.A. Wallace, P. Langton, W.J. Chambliss, R.C. Rist, M.K. Whyte (*Chair*), J.L. Tropea
Associate Professors S.A. Tuch, R. Weitzer, H. Nashman, C. Deitch
Adjunct Associate Professors R.B. Zamoff, M.E. Boeckmann, M.E. McIntosh, R. Whitaker
Assistant Professor M.L. Huffman (*Visiting*)
Adjunct Assistant Professors N.A. Briggs, J.F. Markey
Adjunct Instructor P.A. Konwerski

Committee on Criminal Justice
J.L. Tropea (*Chair*), K.E. Newcomer, W.F. Rowe, L. Sigelman, P. Wahlbeck, A.M. Yezer

Bachelor of Arts with a major in sociology—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite course—Soc 1.
3. Required courses in related areas—12 credit hours in one of the following related social science fields: anthropology, economics, geography, history, political science, or psychology.
4. Required courses in the major—Soc 101, 102, 103, 104, and seven additional 100-level sociology courses including three courses chosen from the 160s group and two courses chosen from the 170s group. Soc 101, 102, 103, and 104 should preferably be taken by the junior year.

Bachelor of Arts with a major in criminal justice—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite course—Soc 1.
3. Required courses in related areas—ForS 103–4, PAd 125, PSc 113 or 115.
4. Required courses in the major—Soc 3, 101, 102, 136, 145, 192, and one course chosen from Soc 135, 178, 184, and 187.
5. Recommended courses in related areas—Anth 154, Phil 142, Psyc 154, and PSc 115.

Bachelor of Arts with a major in human services—The following requirements must be fulfilled.

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite course—Soc 1.
3. Required courses in related areas—Phil 135 and one course chosen from Comm 40, 41, 42, 120; 15 credit hours of 100-level courses in one other department, program, or field of study, as approved by the major advisor.
4. Required courses in the major—HmSr 171, 172, 176, 182, 195; SLP 152; Soc 101, 104, 112

Five-Year Bachelor of Arts with a major in criminal justice and Master of Public Administration—Interested students should contact their advisor about this combined degree program. Application to the graduate portion of the program is made after the fifth semester (at completion of 75 credit hours, 45 of which have been completed at GW with a grade-point average of 3.5). Students must be accepted for the graduate portion of the combined degree prior to the start of the seventh semester. All requirements listed under the Bachelor of Arts in the field of criminal justice, above, are to be completed, with the following required courses in public administration taken during the fourth year: PAd 201, 202, 203, and 207. During the fifth year, PAd 204, 205, 206, 208, and 209, plus three courses in one of any of the fields of concentration in public administration, must be completed. See the Master of Public Administration under the School of Business and Public Management in the Graduate Programs Bulletin

Special Honors—In addition to meeting the general requirements stated under University Regulations, a candidate for graduation with Special Honors in sociology or criminal justice or human services must maintain a 3.3 grade-point average in required courses in the major, must be registered in Soc 195 or HmSr 193 no later than the first semester of the senior year, and must complete a senior honors thesis.

Minor in sociology—A minimum of 15 hours of course work, including Soc 1 and 101 or 103 or 104, plus 9 hours of electives in sociology courses at the 100 level, excluding Soc 119 and 192.

Minor in criminal justice—A minimum of 18 hours of course work, including Soc 1, 136, and 145, plus 6 hours chosen from Soc 167, 178, 184; Anth 154; Phil 142; Psyc 154; ForS 103; PSc 113 or 115; and PAd 125.

Minor in human services—A minimum of 18 hours of course work, including HmSr 176, 182, 195; SLP 152 (6 hours); and an elective (Soc 1 is recommended) chosen with permission of advisor.

Minor in Legal Assistant Program—Columbian School students may undertake courses in the Legal Assistant Program, offered through the University's Center for Career Education and approved by the American Bar Association, as part of their bachelor's degree. The courses that apply to the degree are designated SocL (Sociology/Legal Assistant Program) and are listed below the sociology and human services courses that follow.

Prerequisite: Satisfactory completion of the Legal Assistant Program expository examination. Required: 15 credit hours, consisting of SocL 101, 102, 103, 104, and one course chosen from SocL 105, 106, 107, 108, 109. SocL courses are not counted toward the degree until all 15 hours have been completed. No more than 15 hours may apply to the degree. In addition to the five required SocL courses, students must complete three additional courses—CWLA 202, Legal Research and Writing, and CWLA 213, Legal Accounting, and CWLA 240, Law Lab (listed in Center for Career Education publications)—if a Legal Assistant Certificate is to be earned as well. Credit for these three courses does not apply to the bachelor's degree; the courses require separate fees. Courses in the Legal Assistant Program must be passed with a grade of *C* or better. An overall program average of *B* is required for the Legal Assistant Certificate, which is awarded at the time the degree is conferred. Students who are interested in this option should consult with the Columbian School Student Services Office. Students who choose this option may not apply credit for any courses outside Columbian School toward their degree.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: A student majoring in sociology may not declare a second major or a minor in criminal justice, nor vice versa.

Departmental prerequisite: Soc 1 is prerequisite to all sociology courses except Soc

SOCIOLOGY

1 Introduction to Sociology (3) Staff
A broad overview of the "sociological imagination" as a way of understanding social events and personal experience; sociology's place among the social sciences; basic elements of sociological perspectives. (Fall and spring)

3 Introduction to Criminal Justice (3) Chambliss, Courtless, Weitzer
An introduction to the study of criminal justice. The historical development of criminal justice and its evolution into modern legal systems. The impact of different forms of criminal justice on society and the individual. (Spring)

101 Social Research Methods (3) Tuch
Lecture (3 hours), laboratory (1 hour). Introduction to basic research methods in sociology. Topics include research design, sampling, measurement, and analysis of survey data via computer application. (Fall)

102 Techniques of Data Analysis (3) Tuch
Continuation of Soc 101. Examination of a range of topics in the statistical analysis of sociological data, with a strong emphasis on computer applications. Prerequisite: Soc 101. (Spring)

103 Classical Sociological Theory (3) Courtless, Stephens, Wallace
Development of social thought from 1840 to 1940. Major emphasis on Comte, Marx, Durkheim, Simmel, Weber, Cooley, and Mead. (Fall)

104 Contemporary Sociological Theory (3) Wallace
A systematic study of the work of selected social theories of the post–World War II era. Emphasis on Parsons, Merton, Mills, Collins, Habermas, Giddens, Smith, Homans, Blau, Blumer, Goffman, Berger, Garfinkel. (Spring)

111 Qualitative Research (3) Chambliss, Langton, Weitzer
Examination of the logic of qualitative inquiry and techniques of qualitative data collection and analysis. Various research methods are covered, with an emphasis on intensive interviewing, participant observation in field settings, and focus groups. Prerequisite: Soc 101. (Spring)

112 Evaluation Research (3) Briggs
Introduction to the evaluation of public programs designed to address the impact of social problems on individuals, households, and larger collective groups. Application of social science theory and research methods to the assessment of impact benefits and costs of such programs. Prerequisite: Soc 101, 102. (Fall)

119 Applied Evaluation Research (9) Briggs
Development of applied research skills through seminars, readings, and field placement. Research placement required before registration. Prerequisite: Soc 112. (Spring)

135 Youth and Delinquency (3) Chambliss, Courtless, Tropea
Analysis of historical, economic, and social conditions affecting both difficulties in socializing youth and the evolution of the state's formal systems of control. (Spring)

136 Criminology (3) Chambliss, Courtless, Tropea
Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions. Analysis of the historical, social, legal, and cultural conditions affecting the nature of crime, criminality, and the development of state responses made to it. (Fall)

145 Introduction to Criminal Law (3) Courtless
Introduction to the sources and fundamental principles of criminal law and procedure using major sociological perspectives as interpretive tools. (Spring)

161 Sociology of Complex Organizations (3) Langton, Tropea
Review of sociological approaches to the study of complex organizations. Selected and comparative emphasis on bureaucratic organization in both government and private sectors. (Spring)

162 Sociology of the Family (3) Stephens
An examination of the stages of family life: birth, childhood, premarital relationships, marriage and sex roles in marriage, retirement and old age. Special emphasis on development and maintenance of interpersonal relations. (Fall)

163 Sociology of Education (3) Tropea, Wallace
Analysis of educational systems from historical–comparative, institutional and micro-sociological perspectives. Emphasis on educational systems in relation

to the religious, cultural, economic, and political forces shaping their character; the role of formal education in modern society. (Spring)

164 **Sociology of Medicine and Health Care** (3) Langton
Sociological perspectives on medicine and health care. Emphasis on social, economic, and political processes related to health care, medical occupations, professionals, medical organizations, and delivery of health care services. (Fall)

165 **Sociology of Religion** (3) Wallace, Yeide
Analysis of the relationships between religion and society. Topics include the contribution of religion to social integration, social change, and social inequality; the nature of religious experience; religious symbolism; the basis of religious communities. (Fall)

166 **Comparative Family Systems** (3) Whyte
An examination of the variety of family patterns that have existed or presently exist around the world. The course examines how and why family patterns vary and how economic development, revolutions, and other change forces affect family life. (Spring)

167 **Sociology of Law** (3) Chambliss, Courtless, Tropea
Law as a social phenomenon and agency of social control. Special emphasis is placed on study of the sources of and challenges to the legitimacy of law. (Fall)

168 **Economic Sociology** (3) Tropea
Sociological approach to the study of micro- and macroeconomic behavior. Historical and comparative analyses informed by the literature of sociology and other social sciences. Critical review of economic policy in developing, post-communist and advanced market societies. (Spring)

170 **Class and Inequality** (3) Stephens, Tuch
Analysis of distribution of resources and opportunities for participation in education, and social mobility. International comparisons; analysis of public policies that affect these distributions. (Fall)

173 **Social Movements** (3) Stephens
General survey of the various forms of collective behavior (fads, panics, riots, social movements, etc.), and a more detailed study of the genesis, development and decay of social movements and social revolutions. (Spring)

175 **Sociology of Sex and Gender** (3) Wallace
The roles of women and men from social structural and social psychological perspectives. Analysis of gender inequality in such areas as the family, the workforce, the media, politics, law, religion, and education. (Fall)

178 **Deviance and Control** (3) Tropea, Weitzer
Analysis of the creation of deviance through collective definitions and responses. Development of a perspective on processes of becoming deviant. (Spring)

179 **Race and Minority Relations** (3) Stephens, Tuch, Weitzer
Analysis of relationships between dominant and minority groups in society; nature and range of problems; analysis of the phenomenon of prejudice. (Spring)

181 **Special Topics** (3) Staff
Analysis and examination of various processes in society of general importance to the field of sociology, e.g., social conflict, socialization, social change. Topic changes each semester; may be repeated once for credit. (Fall and spring)

182 **Social Institutions of Contemporary China** (3) Whyte
An introduction to the patterns of social life in China and how these have changed since the revolution in 1949. Topics covered include political and economic institutions, rural social change, family life, education, and social stratification. (Fall)

184 **Violence and the Family** (3) Tropea
Comparative approach to power and violence in family systems. Analysis of devaluation of family relations. Critical survey of explanations of violence and responses made to it. (Fall)

187 **Sociology of Terror** (3) Courtless, Chambliss
Examination of contemporary terrorism, using historical and sociological perspectives. The state and terrorism (the state as terrorist, state-supported terrorism, and the limitations and possibilities of state response to the threat of terrorism). (Spring)

188 **Sociology of Alcohol and Other Drug Use** (3) Langton
A historical overview of alcohol and other drug use. Emphasis on social, economic, and political factors relating to production, consumption, and social policy. (Spring)

192 **Fieldwork in Criminal Justice** (9) Staff
Development of experience-based perspective on criminal justice through readings, seminar, and field placement in legislative, policymaking, and juvenile and criminal justice institutions. Required of criminal justice majors nearing graduation; field placement required before registration. (Fall and spring)

195 **Research** (1 to 3) Staff
Independent study and special projects. Open only to selected undergraduate students with promising academic records. Prerequisite. Students must submit a written proposal of their plan of study for the approval of the staff member of the department who will be directing the research. May be repeated for credit to a maximum of 6 credits. (Fall, spring, and summer)

HUMAN SERVICES

133 **Supervised Experience in Human Services** (3 to 6) Nashman
Fieldwork, internship, and instructional practice. Admission by permission of instructor. (Fall and spring)

171 **Introduction to Human Development I** (3) Staff
Lectures and fieldwork. All aspects of development through adolescence, child study techniques. Two to three hours weekly field experience in appropriate setting. (Fall)

172 **Introduction to Human Development II** (3) Staff
Adult development from young adulthood to old age. Dominant psychological, social, and physical competencies, motivational changes, coping styles, maladaptive behavior. Three hours weekly field experience in appropriate agency setting. (Spring)

176 **Program Planning and Development for Service Agencies** (3) Staff
Examination of program planning and development activities essential to human service agencies. Through case studies and on-site field experiences, students examine and analyze a variety of processes in which agency needs are assessed and programs planned. (Fall)

177 **Human Services and Community: Empowerment for Social Change** (3) Staff
The community as a laboratory for the study of contemporary issues in philanthropy aimed toward social change. Through readings, observations, and group internships, students participate in various aspects of community service. (Fall)

182 **Organization and Administration in the Human Services** (3) Staff
Introduction to organizational theory and program administration in non-school agencies, staff recruitment and development, fiscal operations, personnel and program supervision, facilities, and maintenance of effective community relations. (Spring)

193 **Research and Independent Study** (arr.) Nashman
Individual research under guidance of a staff member. (Academic year)

195 **Seminar in Human Services: Current Issues** (3) Staff
Analysis of selected issues in human services. Each student conducts an investigation of an identified problem in human services and completes a skill assessment project. Admission by permission of instructor. (Spring)

198 **Topics in Human Services** (1 to 3) Nashman
Topics to be announced in the *Schedule of Classes*. May be repeated for credit.

SOCIOLOGY: LEGAL ASSISTANT PROGRAM

101 **Substantive Law** (4)
Basic legal concepts and the vocabulary and resource materials of substantive law as they relate to contracts, torts, domestic relations, trusts and estates, property, the Uniform Commercial Code, business associations, criminal law, and evidence.

102 **Administrative Law** (4)
A survey of the rule-making and adjudicatory procedures in government agencies through case study, enabling statutes, and legislative histories. Analysis of such statutes as the Freedom of Information Act, the National Environmental Protection Act, and the Administrative Procedure Act.

103 **Civil Procedure** (3)
The legal assistant's role in the litigation process. Fact investigation; drafting of pleadings; discovery, summary, and control of documents; and pretrial organization. Structure and jurisdiction of federal and state courts and the Federal Rules.

104 **Legal Ethics** (1)
The American Bar Association Code of Professional Responsibility and the legal assistant's responsibilities and conduct in the private law firm, corporation, government, and other legal settings.

105 **Corporate Law** (3)
Conceptual and practical aspects of corporate structure; public, private, nonprofit, and other corporate entities; the role of the legal assistant in organizing, incorporating, operating, financing, and dissolving the corporate entity.

106 **Criminal Law** (3)
The safeguards of criminal procedure, from arrest through conviction. District of Columbia cases, the Federal Rules of Criminal Procedure, recent Supreme Court and District of Columbia case law on suppression of evidence and statements, and related area of criminal procedure.

107 **Health Law** (3)
The major issues of financing health care: Medicare, Medicaid, private insurers, and uninsured. Overview of cost issue impact and response.

108 **International Law** (3)
The structure of international legal systems. U.S. bilateral and multilateral agreements. The impact of international law vs. domestic law. Overview of international law in today's legal environment.

109 **Telecommunication Law** (3)
Overview of structure and regulation and legal relationships among industry groups. Broadcast regulations, cable television, common carriers, and international and new technology.

SPANISH

See **Romance Languages and Literatures.**

SPECIAL EDUCATION

See **Teacher Preparation and Special Education.**

SPEECH AND HEARING

Professor C.W. Linebaugh
Associate Professors M.D.M. Brewer, J.R. Regnell, V.D. Larson (*Chair*)
Assistant Professors L.B. Stewart, L.R. Goldberg
Assistant Professorial Lecturers M.E. Moody, D. Williamson, C.L. Person, N.S. Richards

Bachelor of Arts with a major in speech and hearing science—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Required courses in related areas—Anth 4 or 161; Psyc 121 and 131 (or equivalents) plus 12 additional credit hours of 100-level courses selected from related areas as approved by the major advisor.
3. Required courses in the major—SpHr 11, 71, 101, 102, 103, 104, 108, 119, 130, 131.

Minor in speech and hearing—15 credit hours are required, including SpHr 71, 101, 103, and at least 6 credit hours of 100-level courses to be selected from SpHr 102, 104, 108, 119, 130, and 131.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Speech and hearing therapy: See the Speech and Hearing Center.

11 **Voice and Diction** (3) Regnell, Moody
Development of naturalness, correctness, and clarity in conversation through the study of phonetics, rate, volume, pitch, and quality in preparation for performance. Laboratory fee, $10. (Fall, spring, and summer)

71 **Foundations of Human Communication** (3) Moody
An introduction to the fundamental principles of the biology of speech, hearing and language, language structure and use, and human communicative interaction. Practice in the identification of specific verbal and nonverbal aspects of communication behavior. (Fall and spring)

72 **Multicultural Issues in Human Communication** (3) Stewart
Consideration of the influences of culture and bilingualism on language development and use and on communicative interaction; experimental and ethnographic methods for studying language and communication in a multicultural society. (Spring)

101 **Hearing Science** (3) Brewer
Anatomy and physiology of the auditory mechanism; basic acoustics and psychoacoustics. Theories of hearing and frequency and intensity perception. Laboratory fee, $20. (Fall)

102 **Neural Substrates of Speech, Hearing, and Language** (3) Staff
Neuroanatomy and neurophysiology as they relate to speech, hearing, and language. Emphasis on sensory and motor systems and neuroanatomical correlates of language processing; neurolinguistics. Laboratory fee, $20. (Spring)

103 **Speech Science** (3) Staff
Functions of the respiratory, laryngeal, and orofacial structures in normal speech production; physiological and acoustic phonetics. Laboratory fee, $20 (Fall)

104 **Speech and Language Disorders** (3) Williamson
Survey of the nature and causes of developmental and acquired disorders of speech and language. Emphasis on prevention and effective communication with persons having a speech–language impairment. (Fall)

108 **Introduction to Audiology** (3) Brewer
Survey of the field of audiology, including the measurement of hearing, the nature and causes of hearing impairment, hearing aids and habilitation/rehabilitation of the hearing impaired. Prerequisite: SpHr 101. Laboratory fee, $20. (Spring)

119 **Experimental Analysis of Communication Behavior** (3) Williamson
Assessment of speaker–listener behavior; acoustic, behavioral, and linguistic properties of speaker intelligibility and credibility; observation, analysis, and modification of speech and language comprehension and expression. Prerequisite: SpHr 71 or 104. Laboratory fee, $20. (Spring)

130 **Phonetics and Phonological Development** (3) Richards
Detailed study of English phonetics and phonology; prespeech vocalization and phonological development; multicultural issues in phonological development; intensive practice in phonetic transcription. Laboratory fee, $25. (Fall)

131 **Language Acquisition and Development** (3) Stewart
Theories of language acquisition, development of language from birth through adolescence; emphasis on development of semantics, syntax, morphology, and pragmatics; multicultural issues in language development. Laboratory fee, $25. (Spring)

196 **Independent Study** (1 to 6) Staff
Independent research and special projects. Before students are permitted to register for SpHr 196, they must submit a written proposal of the plan of study and obtain approval of the staff member who will direct the study and of the department chair.

STATISTICS

Professors H.W. Lilliefors, A.D. Kirsch, J.L. Gastwirth, N.D. Singpurwalla, R.T. Smythe (*Chair*), J.M. Lachin III, J.I. Verter (*Research*), R.P. Bain (*Research*), H.M. Mahmoud, T.K. Navak

Professorial Lecturers J. Kullback, F. Ponti, W.R. Nunn, N. Kirkendall, J.S. Wu, F. Scheuren

Associate Professors B. Toman, J. Rochon (*Research*), E.A. Thom (*Research*), S. Bose, R. Modarres-Hakimi, Z. Li
Associate Professorial Lecturers R.F. Teitel, C. Cowan
Assistant Professors D.A. Grier, N. Younes (*Research*), E. Bura, V. Katsikiotis (*Research*)
Assistant Professorial Lecturer R. Fernandez

Bachelor of Science with a major in statistics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian School of Arts and Sciences.
2. Prerequisite courses—Math 31, 32, 33; Stat 91 or another first course in statistical methods.
3. Required courses in the major—Math 124; Stat 118, 119, 129, 130, 157–58, 183, plus three approved 100-level courses, some of which, in special circumstances, may be taken in other departments. To assure a balanced program, departmental approval of electives is required for all majors.

Students who seek Special Honors in statistics should check with the Department.

Minor in statistics—18 hours of approved courses in this department, including an introductory statistics course, Stat 118 or 123, and one computer course.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: Stat 51, 53, 91, 104, 111, and 127 are related in their subject matter, and credit for only one of the six may be applied toward a degree. One entrance unit in algebra is prerequisite to all courses in statistics.

51 Introduction to Business and Economic Statistics (3) Staff
Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, probability distributions, sampling, estimation, tests of hypotheses, regression and correlation, with applications to business. (Fall and spring)

53 Introduction to Statistics in Social Science (3) Staff
Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, regression and correlation, with applications to social science. (Fall and spring)

91 Principles of Statistical Methods (3) Staff
Probability, frequency distributions and their characteristics, descriptive measures, estimation, tests of hypotheses, regression and correlation. Primarily for students in the natural sciences. (Fall)

103 Sampling in Accounting (3) Pooli
Special emphasis on applications of sampling techniques and design to accounting problems. Prerequisite: Stat 51, 53, 91, or equivalent. (Fall and spring)

104 Statistics in Management, Administration, and Policy Studies (3)
Lecture (3 hours), laboratory (1 hour). Introductory study of statistical techniques for research problems. For graduate students in fields other than statistics who have no previous statistics training. Offered off campus only.

105 Statistics in the Behavioral Sciences (3) Kirsch
Lecture (3 hours), laboratory (1 hour). Advanced study of statistical techniques for research problems. Analysis of variance, correlation techniques, nonparametric techniques, sampling theory. Prerequisite: an introductory statistics course and satisfactory performance on a placement examination. (Fall and spring)

111 Business and Economic Statistics I (3) Nayak and Staff
Descriptive statistics, graphical methods, probability, special distributions, random variables, sampling, estimation and confidence intervals, hypothesis testing, correlation and regression. (Fall)

112 Business and Economic Statistics II (3) Nayak and Staff
Continuation of Stat 111, with emphasis on techniques of regression, chi-square, sampling designs, index numbers, time series, decision analysis, and other topics used in economics and business. Prerequisite: Stat 111 or equivalent. (Spring)

118 **Regression Analysis** (3) Bura
Lecture (3 hours), laboratory (1 hour). Simple and multiple linear regression, partial correlation, residual analysis, stepwise model building, multicollinearity and diagnostic methods, indicator variables. Prerequisite: an introductory statistics course. (Fall and spring)

119 **Analysis of Variance** (3) Staff
Lecture (3 hours), laboratory (1 hour). Introduction to the design of experiments and analysis of variance; randomized block, factorial, Latin square designs, and analysis of covariance. Prerequisite: Stat 118. (Spring)

123 **Introduction to Econometrics** (3) Staff
Same as Econ 123.

127 **Statistics for the Biological Sciences** (3) Staff
Introduction to statistical techniques and reasoning applicable to the biomedical and related sciences. Properties of basic probability functions: binomial, Poisson, and normal. Data analysis, inference, and experimental design. (Fall and spring)

129 **Introduction to Computing** (3) Staff
Introduction to elements of computer programming and problem-solving using Pascal. Hands-on experience will be acquired through computer programming projects, including some simple statistical applications. (Fall and spring)

130 **Computer Programming** (3) Staff
Development of advanced computing ideas: records, recursion, sets, pointer variables and dynamic storage. Introduction to data structures: stacks, queues, linked lists, and binary search trees. Prerequisite: Stat 129 or equivalent. (Fall and spring)

131 **Data Structures and Algorithms** (3) Staff
Analysis of algorithms. Development and application of advanced data structures, binary trees, heaps, Patrica trees, AVL trees, B-trees, tree balancing, and graphs. Sorting and searching algorithms. Prerequisite: Stat 130 or equivalent. (Fall and spring)

132 **Introduction to Discrete Structures** (3) Mahmoud
Same as Math 132.

142 **Introduction to Automata Theory** (3) Mahmoud
Finite state automata. Turing machines and computability: universal Turing machine, computable and noncomputable functions, halting problem. Formal grammars and their relationship to automata. Prerequisite: Stat 130 and Math Stat 132. (Spring)

157–58 **Introduction to Mathematical Statistics** (3–3) Staff
Stat 157: Basic concepts of probability theory, including random variables, independence, distribution theory, and sampling theory. Stat 158: Inference procedures, including estimation, hypothesis testing, regression analysis, and experimental design. Prerequisite: Math 32 or equivalent. (Academic year)

173 **Discrete Systems Simulation** (3) Staff
Same as OR 173.

181 **Applied Time Series Analysis** (3) Kirkendall, Wu
Autoregressive integrated moving average (ARIMA) modeling and forecasting of univariate time series. Estimation of spectral density functions, white noise tests, and tests for periodicities. Theory and applications using SAS on the GW computer. Prerequisite: Math 33, Stat 157–58 or 118. (Fall)

183 **Intermediate Statistical Laboratory: Statistical Computing Packages** (3) Lilliefors, Modarres-Hakimi
Application of program packages (e.g., SAS, SPSS) to the solution of one-, two- and k-sample parametric and nonparametric statistical problems. Basic concepts in data preparation, modification, analysis and interpretation of results. Prerequisite: an introductory statistics course. (Fall and spring)

185 **Computer Performance Modeling** (3) Mahmoud
Mathematical tools for modeling and predicting the speed and utilization of computer systems, including deterministic, stochastic, and computer simulation models. Queuing models, Poisson processes, birth–death processes, and response surfaces. Prerequisite: Stat 130 and 157 or equivalent. (Spring)

187 **Introduction to Sampling** (3) Scheuren
Problems of sampling and sample design. Prerequisite: Stat 91 or equivalent. (Fall)

188 **Nonparametric Statistical Inference** (3) Lilliefors
Statistical inference when the form of the underlying distribution is not fully specified. Nonparametric procedures for estimation and testing hypotheses. An introduction to robust procedures. Prerequisite: Stat 91 or equivalent. (Spring, odd years)

189–90 **Mathematical Probability and Applications** (3–3) Staff
Probability theory, including combinatorial analysis, conditional probability and stochastic independence. Random variables and their distributions; laws of large numbers and central limit theorem. Application of concepts to elementary stochastic processes such as coin-tossing sequences, branching processes, Markov chains. Prerequisite: Math 32 or equivalent. (Alternate academic years)

195 **Reading and Research** (arr.) Staff
May be repeated once for credit. Admission by permission of department chair. (Fall and spring)

197 **Fundamentals of SAS Programming for Data Management** (3) Modarres-Hakimi
Fundamentals of the SAS system for data management, statistical analysis and report writing. Data modification; programming; file handling; and macro writing. Prerequisite: An introductory statistics course and Stat 129. (Fall)

198 **Special Topics** (3) Staff
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the content differs.

STRATEGIC MANAGEMENT AND PUBLIC POLICY

Professors H.I. Davis, W.H. Becker, D.J. Lenn.
Professorial Lecturer W.N. LaForge
Associate Professors J.B. Thurman, J. Cook, E.J. Englander (*Chair*), J.H. Beales III, M. Starik, L. Burke
Associate Professorial Lecturers M.N. Richburg, P. Loungani
Assistant Professors D.R. Kane, H. Kim, R.A. Carruth, J. Griffin
Assistant Professorial Lecturer S.E. Borke
Instructor A. Prakash

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration.

51 **Introduction to Business** (3) Staff
Structure, activities, and problems of business enterprise; its contribution to individual and society; careers in business. Prerequisite: Sophomore standing. (Fall and spring)

104 **Business Law: Regulatory Environment of Business** (3) Staff
Same as Accy 153.

105 **Business Law: Contract, Torts, and Property** (3) Staff
Same as Accy 151.

106 **Business Law: Enterprise Organization** (3) Staff
Same as Accy 152.

190 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods.

199 **Independent Study** (arr.) Staff
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

TEACHER PREPARATION AND SPECIAL EDUCATION

Programs in teacher preparation and special education are offered at the graduate level by the Graduate School of Education and Human Development. The following courses are available to undergraduates.

SPECIAL EDUCATION

187 **Sign Language and Deafness I** (3)
Introduction to American Sign Language and to cultural aspects of the deaf community.

188 **Sign Language and Deafness II** (3) Staff
Development of conversational skills in American Sign Language and of cultural awareness of the deaf community. Prerequisite: SpEd 187.

THEATRE AND DANCE

Professors M.R. Withers, A.G. Wade, L.B. Jacobson (*Chair*)
Associate Professors N.C. Garner, W.A. Pucilowsky
Assistant Professors B.W. Sabelli, C.F. Gudemus, J. Mills, S. Wolf

Bachelor of Arts with a major in theatre—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Required courses in related areas—12 credit hours in dramatic literature and playwriting at the 100 level.
3. Required courses in the major—TrDa 14, 130, 139 (3 credits), 145–46, 147; 6 credit hours chosen from TrDa 131, 135, 136; 12 additional credit hours in 100-level theatre and dance courses.

Bachelor of Arts with a major in dance—The following requirements must be fulfilled:
1. The general requirements stated under Columbian School of Arts and Sciences.
2. Required courses in the major: 13 credit hours of courses in technique; 17 hours of courses in creative process/performance; 3 hours of production design; 6 hours of electives. The department maintains a list of courses that fulfill these requirements.

Bachelor of Arts with a major in dramatic literature—The Department of Theatre and Dance and the Department of English offer an interdisciplinary major in dramatic literature. See Dramatic Literature.

Minor in Theatre—18 credit hours of theatre courses, including TrDa 145–46.
Minor in Dance—18 credit hours of dance courses, including no more than 9 hours from TrDa 49 through 59 and 160 through 175, plus 3 hours from TrDa 180, 182–83, 186, and 191.

Special Honors—In addition to meeting the general requirements stated under University Regulations, candidates for graduation with Special Honors in Theatre or Dance must have a grade-point average of 3.4 in the major and complete TrDa 199 with a grade of 50. They must consult with a faculty advisor at the beginning of the first semester of the senior year to determine eligibility, area of study, and the director of the research or creative project.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: Courses below the 100 level are primarily for nonmajors.

11 **Theatre Production** (3) Sabelli
Understanding of the basic elements of production (performance, technical and management) and the collaborative artist/artisan process through discussion, observation, and practical application. (Fall and spring)

14 **Introduction to Acting** (3) Garner, Jacobson, Wade
Basic techniques of concentration, imagination, improvisation, and character development. (Fall and spring)

45 **Understanding the Theatre** (3) Sabelli
The art of the theatre; its literature, architecture, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer. Attendance at theatrical performances, presentations, and videos. (Fall and spring)

46 **Understanding the Dance** (3) Mills and Staff
The knowing, doing, and making of the art of dance through creative processes, dance styles, history, and visual representations. (Fall and spring)

49 **Introduction to Dance and Movement Awareness** (2) Mills and Staff
Human movement and its connection to dance. Fundamental movement concepts that underlie all movement styles. Basic principles of awareness and organization into movement patterns. May be repeated for credit.

50 **Beginning Ballet** (1) Staff

51 **Beginning/Intermediate Ballet** (1) Staff

52 **Beginning Modern Dance** (1) Staff

53 **Beginning/Intermediate Modern Dance** (1) Staff
58 **Beginning Spanish Dance** (1) Staff
59 **Beginning/Intermediate Spanish Dance** (1) Staff
105 **Fundamentals of Playwriting** (3) Griffith
Same as Engl 105.
108 **Intermediate Playwriting** (3) Griffith
Same as Engl 108
115 **Introduction to Scene Study: Realism** (3) Garner, Jacobson
Principles of role development, concentrating on 20th-century material. Prerequisite: TrDa 14. (Fall and spring)
116 **Scene Study: Voice and Character** (3) Jacobson
The practice and application of voice production with reference to skeletal alignment, breathing, resonance, and articulation. Emphasis on the process of voice production and its application to performance through work on scenes and monologues. Prerequisite: TrDa 115. (Fall and spring)
120 **Scene Study: Postrealism** (3) Wade
The actor's approach to the presentational aesthetics in the work of modern and contemporary dramatists. Prerequisite: TrDa 116. (Spring, even years)
121 **Scene Study: Contemporary Comedy** (3) Garner, Jacobson
Principles of role development, comic timing, and stage business, concentrating on material by contemporary playwrights, such as Neil Simon. Prerequisite: TrDa 116. (Fall, even years)
122 **Scene Study: Shakespeare** (3) Wade
Principles of role development and handling of verse dialogue in Shakespearian drama. Prerequisite: TrDa 116. (Fall, odd years)
123 **Scene Study: Classical Comedy** (3) Jacobson, Garner
Principles of role development, concentrating on material from the English Restoration, Molière, and other 17th- and 18th-century playwrights. Prerequisite: TrDa 116. (Spring, even years)
124 **Play Analysis** (3) Wade
Same as Engl 124
125 **Stage Dialectics** (3) Jacobson
Vocal production related to interpretation of specific texts. Focus on stage dialects and the interpretation of Shakespeare. Prerequisite: TrDa 116. (Spring)
127 **Scene Study: Film and Television** (3) Wade
Techniques of acting for the camera; analysis of film and television scripts from actor's point of view. Prerequisite: TrDa 116. Laboratory required. Laboratory fee, $10. (Spring, odd years)
128 **Audition Techniques** (3) Garner
All aspects of the audition process: selection and rehearsal of audition materials, logues, handling of cold reading, etc. Prerequisite: TrDa 116. (Fall, even years)
130 **Basics of Production Design** (3) Sabella, Pucilowsky, Gadow
Understanding of the basic elements of production design and execution through discussion, observation, and practical application. Laboratory required. Laboratory fee, $50. (Fall and spring)
131 **Introduction to Lighting** (3) Gadow
Lecture (2 hours), laboratory (1 hour). Theories and practicum in lighting for theatre and dance. Laboratory fee, $15. Prerequisite: TrDa 130. (Fall)
132 **Makeup Design** (3) Pucilowsky
Theory and practicum in the art of makeup design, including latex and crepe
135 **Introduction to Scene Design** (3)
Fundamental study of scenography, including historic overview, basic drafting, and rendering techniques, through the use of various mediums and script analysis. Prerequisite: TrDa 130. (Fall, odd years)
136 **Beginning Costuming** (3) Pucilowsky
History of fashion in Western civilization from ancient Greece to the 20th century. Fundamental study of costume research through specific projects. Costume construction. Prerequisite: TrDa 130. (Fall)
139 **Theatre Practicum** (1) Gadow
Participation in department mainstage productions in a production or management capacity under the supervision of a member of the faculty. Prerequisite: TrDa 11 or 130. May be repeated for credit. After completing for 3 credits

dents may participate in a performance capacity for an additional 3 credits. Prerequisite: TrDa 11 or 130. (Fall and spring)

140 **Anthropology in Performance** (3) Garner, Allen
Exploration of the relationships among social interaction, ritual, and dramatic performance. Classes consist of improvisation workshops and discussion, based on readings about non-Western cultures. Same as Anth 191. (Spring)

145–46 **History of the Theatre** (3–3) Wolf
A dramaturg's approach to case studies of theatre in historical context. TrDa 145: Ancient Greece through the 17th century. TrDa 146: the 18th, 19th, and 20th centuries. (Academic year)

147 **Directing for the Theatre** (3) Garner
Fundamentals of script analysis, casting, and rehearsal techniques. Prerequisite: TrDa 14, 130, 145–46. Laboratory fee, $15. (Fall)

160–61 **Intermediate Ballet** (2–2) Staff
May be repeated for credit. Prerequisite: TrDa 51 or equivalent.

162–63 **Intermediate/Advanced Ballet** (2–2) Staff
May be repeated for credit. Prerequisite: TrDa 160 or 161 or equivalent.

164–65 **Advanced Ballet** (2–2) Staff
May be repeated for credit. Prerequisite: TrDa 162 or 163 or equivalent.

170–71 **Intermediate Modern Dance** (2–2) Mills and Staff
May be repeated for credit. Prerequisite: TrDa 49 or equivalent.

172–73 **Intermediate/Advanced Modern Dance** (2–2) Mills and Staff
May be repeated for credit. Prerequisite: TrDa 170 or 171 or equivalent.

174–75 **Advanced Modern Dance** (2–2) Staff
May be repeated for credit. Prerequisite: TrDa 172 or 173 or equivalent.

180 **Movement Improvisation and Performance** (3) Withers
Exploring the body and its surroundings in movement, use of language, narrative, environments and contexts for creative expression, developing event and performance structures from improvisation.

182–83 **Dance Composition** (3–3) Withers
TrDa 182: Problems in structural and conceptual aspects of making dances, including scripting and scoring for performance. TrDa 183: Emphasis on intention and content in making dances. TrDa 180 recommended. (Academic year)

184 **Choreographic Projects** (3) Withers
Create a dance or a performance work of individual design, including casting, rehearsal procedures, staging aspects, and public presentation. Prerequisite: TrDa 131, 180, 182, 192. May be repeated for credit.

185 **Trends in Performance Art** (3) Staff
Study of the theory and practice of contemporary performance art movements and artists, scripting and scoring to create performance works based on a single art discipline or interdisciplinary arts, including movement, text, voice, visual elements, music, and multimedia.

186 **Movement Analysis** (3) Withers
Deepen understanding of the moving body as the instrument for performance with emphasis on process and awareness, includes kinesiology, dynamic alignment, efficiency, integration of body and mind, release techniques, initiative, and weight in motion. Prerequisite: TrDa 49. (Fall)

191 **Dance History** (3) Staff
The history of dance as a cultural and artistic entity.

192 **Repertory/Performance** (1 or 2) Mills, Withers
Participation in the processes of learning dance repertory and performing dance works. Audition required. Laboratory required. May be repeated for credit.

193–94 **Dance Styles** (arr.) Staff
Forms of theatrical dance other than ballet or modern. [Academic year]

195 **Selected Topics** (3) Staff
Topics of current interest in theatre or dance. Topics announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

196 **Independent Study** (1 to 6) Staff
Independent research and special projects. Open to seniors or exceptionally well-prepared juniors majoring in theatre or dance. Before students are permitted to register for TrDa 196, they must submit a written proposal of the plan of study and obtain approval of the faculty member who is directing the study and the department chair.

198 **Internship** (3 or 6) Staff
Open to seniors majoring in theatre or dance. Work placements with not-for-profit and commercial theatre and dance organizations for an approved number of hours per week. Admission requires departmental approval. May be taken for a maximum of 6 hours. (Fall and spring)

199 **Honors Thesis** (arr.) Staff
Directed research and/or creative project. Open to qualified seniors by permission. Arrangements must be made with a sponsoring faculty member in the department early in the first semester of the senior year. May be repeated for credit.

TOURISM AND HOSPITALITY MANAGEMENT

Professor D.E. Hawkins (*Director*)
Adjunct Professor J. Burke
Associate Professors D. Frechtling, L. Yu
Assistant Professors L.A. Delpy, J.J. Goldblatt, S.E. Spivack
Adjunct Assistant Professor S.D. Cook

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration and the five-year, dual-degree program leading to the Bachelor of Business Administration and Master of Tourism Administration.

104 **Introduction to Tourism and Hospitality Management** (3) Spivack
Historical overview and survey of the tourism and hospitality industry, with emphasis on the travel market, delivery of hospitality services, professional roles, and emerging trends. (Fall and spring)

113–14 **Practicum** (3–3) Delpy
Fieldwork, internship, and/or instructional practice, including conference and/or seminar. May be repeated once for credit with permission of advisor. (Fall, spring, and summer)

135 **Sport and Recreation Business Enterprises** (3) Delpy
An overview of business opportunities related to sport and recreation. Emphasis on sport and recreation facilities and events; product manufacturing, merchandising, and licensing; media and publications; memorabilia; and athlete representation. (Fall)

136 **Sport and Recreation Marketing** (3) Delpy
Application of marketing theories and practices to sport and recreation events or properties. Sponsorship, endorsement proposals, promotional campaigns. Prerequisite: BAdm 110. (Spring)

137 **Issues in Sport and Recreation Management** (3) Del
Trends, opinion leaders, political realities, rules, regulations, and other sport administration issues. (Spring or summer)

143 **Hospitality Industry Management** (3)
An overview of the basic principles and practices involved in the management, operation, marketing, and financing of hotels, restaurants, and other hospitality goods and services. (Spring)

144 **Financial Management in the Tourism and Hospitality Industry** (3)
Basic principles of planning and managing tourism resources, development and facilities in relation to investment constraints and opportunities. Financial monitoring and control of hospitality facilities and related leisure services. (Spring)

145 **Travel Marketing Communications** (3) Spivack
Review of basic advertising, public relations, and sales techniques, applied to the tourism and hospitality industry. Current practices and case studies. (Fall)

147 **Passenger Transportation Systems** (3) St
Survey of passenger transportation modes. Emphasis on airline operations, marketing communications, and distribution channels. (Spring)

172 **International Experiences** (1 to 6) Delpy
Travel to a foreign country for study of a specific topic. May be repeated for credit with permission of the advisor. (Fall, spring, and summer)

190 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods. May be repeated once for credit. (Fall, spring, and summer)

193 **International Tourism Destinations** (1 to 6) Staff
Physical and cultural geography of selected major tourist destinations with focus on effects of their social, economic, and environmental attributes. (Fall and spring)

199 **Independent Study** (3) Staff
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall, spring, and summer)

UNIVERSITY PROFESSORS

University Professors A. Etzioni, P.J. Caws, S.H. Nasr, K.F. Schaffner, J.N. Rosenau

Courses numbered in the 770s and 780s are taught by distinguished scholars who hold appointments as University Professors. With the approval of the department or program concerned, appropriate University Professor courses may be taken to satisfy degree program requirements. Permission of the University Professor may be required for enrollment. A complete listing of courses offered each semester appears in the *Schedule of Classes* under the 700 series. Following is a list of courses that are expected to be taught fairly regularly by University Professors.

IAff/PSc

770 **Turbulence in World Politics** (3) Rosenau
An effort to probe the sources and dynamics of change and continuity in local, national, and international affairs. The links between the orientations of individuals and the actions of collectivities are a major focus, along with the foundations of authority under transformative conditions. For graduate students; open to upper-level undergraduates.

IAff/PSc

771 **Political Aggregation** (3) Rosenau
An exploration of how collective action is fashioned out of the input of individuals, how collectivities become larger than the sum of their parts, and how political organizations manage to persist through time. Socialization, mobilization, momentum, and bandwagon effects are among the concepts evaluated. For graduate students, open to upper-level undergraduates.

IAff/PSc

772 **The Dynamics of Globalization** (3) Rosenau
An inquiry into the economic, cultural, and political processes through which individual and community life is expanding as awareness encompasses factors on a global scale. The consequences of this expansion at both global and local levels is examined, along with the possibility that these levels interact. For graduate students; open to upper-level undergraduates.

IAff/PSc

773 **Global Governance** (3) Rosenau
An inquiry into the prospects for and problems of governance on a global scale in the era following the end of the Cold War. Informal forms of governance as well as those that have undergone institutionalization. For graduate students, open to upper-level undergraduates.

HmSc

771 **The Cinema of Morals/The Morals of Cinema** (3) Caws
Vicarious moral experience in the cinema; examples of such experience in film and the moral arguments they provoke; the power of cinema as a shaper of moral sentiment; moral issues in the production and distribution of films. For graduate students; open to undergraduates.

Phil

772 **Individualism** (3) Caws
The concept of the free individual in philosophy, psychology, literature, and politics; individuals and groups; individualism and collectivism; exemplary individuals in biography, autobiography, and fiction; problems of individual and collective agency and identity. For undergraduates, open to graduate students.

Phil
774 **Understanding Technology** (3) Caws
The idea of technology—its relation to the sciences and the arts and humanities, its development, and its problems. Technology will not be regarded as merely dependent on the sciences or as merely useful (or dangerous) but as a human activity in its own right, with its own history, conceptual structure, interests, risks, and benefits. For undergraduates; open to graduate students

Phil
778 **Left and Right in Philosophy and Politics** (3) Caws
A fundamental inquiry into the concept of the state in terms of entrenched oppositions: individualism/collectivism, equality/liberty, liberalism/conservatism, socialism/free enterprise, communism/capitalism. Emphasis on the present need to find a constructive transcendence of these oppositions. For graduate students; open to undergraduates.

Phil
779 **Philosophy and Psychoanalysis** (3) Caws
An exploration of some striking parallels between the topics addressed by Freud's psychoanalytic theories on the one hand and the traditional content of philosophical reflection on the other, with special emphasis on the relation between cognitive theory and therapeutic practice (in both disciplines). For graduate students; open to undergraduates.

HCS/Phil
770 **Philosophy of Medicine** (3) Schaffner
An introduction to philosophical issues in medicine, including scientific progress, the doctor–patient relationship, whether diseases are objective or socially conditioned entities, clinical reasoning using some simple examples from medical diagnosis and new drug testing, and ethical and social issues raised by the AIDS epidemic. For undergraduates; open to graduate students.

Phil
771 **Philosophy of Biology** (3) Schaffner
An introduction to philosophical issues in biology, including evolutionary biology (Darwinian and neo-Darwinian), molecular biology and reductionism, teleology, philosophical implications of the neurosciences, sociobiology, and evolutionary ethics. For undergraduates; open to graduate students.

HCS/Phil
773 **Introduction to the Medical Humanities** (3) Schaffner
Practical ways in which the humanities can assist problem solving in medicine and health care. Philosophical theories of medicine and health care, the role of literature in modeling ethical deliberation, and the roles of religious and humanistic values in a secular decision-making environment. For undergraduates and medical students; open to graduate students.

HCS/Phil
775 **Ethics and Health Policy** (3) Schaffner
The problem of health care reform and ethical issues associated with managed care and competition, Medicare and Medicaid reform, and the issue of health care rationing. Issues relating to the "right to die," including active and passive euthanasia and doctor-assisted suicide. For graduate students; open to undergraduates.

HCS/Phil
777 **The Human Genome Project: Ethical, Legal, and Social Implications** (3) Schaffner
Ethical, legal, and social implications of the plan to sequence the entire human genome by the year 2005, including confidentiality of genetic information, genetic discrimination and insurance, reductionistic and deterministic implications of the project, the role of public opinion, and research priorities in health care. For graduates and medical students; open to undergraduates

Phil
780 **Neurobiology and Reductionism** (3) Schaffner
Recent developments in neuroscience, including neural networks; philosophical implications, including the relations among genetics, brains, and

sciousness. There are no specific prerequisites, but some experience in neuroscience, neural networks, or the philosophy of science is desirable. For graduate students; open to qualified undergraduates.

Rel

770 **Islamic Civilization and the West** (3) Nasr
The encounter of Islam and the West, from the rise of Islam to modern times. Investigation of the impact of Islam on European philosophy, science, art, and literature; influence of the West and Western scholarship on the Islamic world. For juniors and seniors; open to graduate students.

Rel

771 **Persian Sufi Literature in East and West** (3) Nasr
The writings of major Persian Sufi poets and writers, such as Khayyam, Attar, Rumi, Shabistari, and Hafiz, and their impact on the West and on India. The translation of these works into European languages and their influence upon such figures as Goethe and Emerson are discussed. Assigned readings in English. For undergraduates; open to graduate students.

Rel

772 **Mysticism—East and West** (3) Nasr
A thematic examination of mystical traditions, the nature of mysticism, the search for ultimate reality, the mystical significance of the cosmos, the mystical science of the soul, and the significance of sacred art and symbols. Major mystical traditions of East and West—Hinduism, Taoism, Buddhism, Judaism, Christianity, Islam. For undergraduates; open to graduate students.

Rel

773 **Perennial Philosophy** (3) Nasr
The idea of perennial philosophy as developed in the 20th century by A. Huxley, A.C. Coomaraswamy, and others. Doctrines and teachings of perennial philosophy as found in various religious and philosophical traditions of East and West. Prerequisite: at least one course in religion, philosophy, or intellectual history. For undergraduates; open to graduate students.

Rel

775 **Man and the Natural Environment** (3) Nasr
The religious, philosophical, and scientific causes of the present environmental crisis. The history of religious and philosophical attitudes toward nature in the West, the history of Western science, and some non-Western world views that may encourage a more harmonious relationship between man and the natural environment. For undergraduates; open to graduate students.

Rel

777 **Religion and Science** (3) Nasr
The interaction between religion and science in ancient Egypt, classical Greece, Islam, India, China, and the West, from the Renaissance, the scientific revolution, and up to the present day. Key concepts and issues in the encounter of religion and science in light of the cultural matrix of the civilization and period in question. For juniors and seniors; open to graduate students.

Soc

776 **Public Policy Research** (3) Etzioni
Basic concepts of policy research in comparison to basic and applied research. Policy research methods. The social structure of policy research: producers and consumers of knowledge and issues arising among them. Open to undergraduates and graduate students with permission of the instructor. Prerequisite: social science or public policy course work or related experience.

Soc/Econ/PSc

779 **The Elements of Socioeconomics** (3) Etzioni
A synthesized approach to the study of economic behavior and economic policy, drawing on relevant segments of economics and sociology as well as political science and psychology. A discussion of ethical assumptions and core concepts in the study of micro- and macroeconomic behavior and their policy implications. For graduate students; open to qualified undergraduates.

Soc/PSc/IAff
781 **Elements of Communitarian Thinking** (3) Etzioni
An examination of the roots of communitarian thinking in earlier philosophical work, current political theory, and historical and contemporary sociology. The relevance of communitarian thinking to various community-building social movements. For graduate students, open to undergraduates with permission of instructor.

Soc/PSc/IAff
782 **Elements of Public Policy in Communitarian Perspective** (3) Etzioni
The issues that arise when communities seeking to advance their goals run into commitments to individual and minority rights. Freedom of speech and hate codes, public safety and protection against search and seizure, majority votes and minority rights, and other policy issues. For graduate students; open to undergraduates with permission of instructor

VIETNAMESE

See **East Asian Languages and Literatures.**

WOMEN'S STUDIES

Associate Professors P.M. Palmer, B.D. Miller (*Director*), C.E. Harrison, C. Deitch
Associate Professorial Lecturer C.A. Douglas
Assistant Professorial Lecturer B. Morris
Lecturer N. Turner

Committee on Women's Studies

N. Cahn, M.M. Cassidy, C. Deitch, C.E. Harrison, S. Lynch, B.D Miller, D. Moshenberg, T. Murphy, P.M. Palmer, A. Romines

Minor in women's studies—Undergraduates who select a minor in women's studies must declare their intention to the director no later than the beginning of their senior year. Students are required to complete at least 18 credit hours for the minor, including two core courses (WStu 120 and 125) and four additional courses (of which at least three are at the 100 level), as approved by the advisor.

1 **Women in Western Civilization** (3) Staff
Exploration of critical periods of intellectual and cultural change in Western societies as influenced by and affecting women. Examination of images of women and of changing ideal types of femininity and masculinity. Aspects of law, religion, art, culture, work, and politics in relation to these topics. (Fall)

2 **The Anthropology of Gender in Western Civilization** (3) Miller and Staff
An examination of sex, as a biological concept, versus gender, as culturally constructed meanings and practices on the basis of sex. Theoretical and methodological approaches developed in the West since World War II are applied critically to specific cases and events. Same as Anth 20. (Spring) Staff

120 **Introduction to Women's Studies** (3)
A multidisciplinary examination of historical conditions, cultural norms, and social institutions that define women's status in Western culture. Experiences of girls and women in various racial–ethnic, class, and age groups. Alternative visions for women's (and, by implication, men's) roles and status. Sophomore standing required. (Fall) Staff

125 **Varieties of Feminist Theory** (3)
A review, through both classical and contemporary texts, of the variety of feminist explanations of women's status. Relationships within the sex/gender system and arrangements based on class and race. Evaluation, through the lens of feminist theory, of several of the established academic disciplines in the sciences, social sciences, and humanities. (Spring) Staff

136 **Chinese Women in Myth, Literature, and Film** (3)
Same as Chin 136.

139–40 **Women in the United States** (3–3) Murphy, Harrison
Same as Hist/AmSt 139–40.

170 **Selected Topics** (3) Staff
Examination and analysis of central issues in women's studies, such as women and difference, women in media, women and violence, women and spirituality, psychoanalysis and women. Topic changes each semester, may be repeated for credit. (Fall and spring)

181 **Women in Western Religion** (3) Staff
Same as Rel 181.

183 **Practicum in Women's Studies** (3) Deitch
Study of the changing status of women through supervised assignment to public and private agencies engaged in policymaking, education, political action, and research. Placement arrangements must be made the semester prior to registration; departmental permission is required. (Spring)

195 **Undergraduate Research** (1 to 3) Staff
A written proposal approved by the member of the faculty who will supervise the research is required prior to registration.

FACULTY AND STAFF OF INSTRUCTION 1997–1998
(as of Fall 1997)

Columbian School of Arts and Sciences

School of Business and Public Management

Graduate School of Education and Human Development

School of Engineering and Applied Science

Elliott School of International Affairs

EMERITI

Lewis Francis Affronti, *Professor Emeritus of Microbiology and Immunology*
B.A. 1950, M.A. 1951, State University of New York at Buffalo; Ph.D. 1958, Duke University

Galip Mehmet Arkilic, *Professor Emeritus of Engineering and Applied Science*
B.S. in M.E. 1946, Cornell University; M.S. 1947, Illinois Institute of Technology; Ph.D. 1954, Northwestern University

Robert Edward Baker, *Professor Emeritus of Education*
B.S. in Ed. 1939, State University of New York at Buffalo; M.A. 1954, Catholic University of America; M.A. in Ed. 1956, Ed.D. 1962, George Washington University

Ruth Lillian Aaronson Bari, *Professor Emeritus of Mathematics*
B.A. 1939, City University of New York, Brooklyn College; M.A. 1943, Ph.D. 1966, Johns Hopkins University

Shirley Russell Barnett, *Associate Professor Emeritus of Spanish*
B.A. 1944, Vassar College; M.A. 1946, Vanderbilt University; Ph.D. 1958, University of Minnesota

Lee Sheward Bielski, *Professor Emeritus of Speech Communication*
B.S. 1940, Ohio University; M.A. 1944, University of Michigan

Guy Black, *Professor Emeritus of Business Economics*
B.S. 1941, Harvard University; M.A. 1948, Ph.D. 1951, University of Chicago

Giorgio Vittorio Borgiotti, *Professor Emeritus of Engineering and Applied Science*
Eng.Dr. 1957, University of Rome

Perry Botwin, *Professor Emeritus of Special Education*
B.S. 1942, Rutgers University; M.A. 1947, New York University; Ed.D. 1957, Columbia University

Lloyd Spencer Bowling, *Professor Emeritus of Speech and Hearing*
B.A. 1954, M.A. 1957, Ed.D. 1964, University of Maryland

Marcella Brenner, *Professor Emeritus of Education*
B.S. in Ed. 1934, Johns Hopkins University; M.A. 1949, American University; Ed.D. 1962, George Washington University

David Springer Brown, *Professor Emeritus of Management*
B.A. 1936, University of Maine at Orono; Ph.D. 1955, Syracuse University

Frederick James Brown, Jr., *Professor Emeritus of Education*
B.A. 1947, M.Ed. 1951, Western Maryland College; Ed.D. 1962, Columbia University

Robert Guy Brown, *Professor Emeritus of Sociology*
B.A. 1949, University of Rhode Island; M.A. 1951, Ph.D. 1960, University of North Carolina

Ben Burdetsky, *Professor Emeritus of Personnel and Labor Relations and of Public Administration*
B.S. 1950, M.S. 1958, Temple University; Ph.D. 1968, American University

Elizabeth Burtner, *Professor Emeritus of Physical Education*
B.A. 1927, Hood College; M.A. 1935, Columbia University

Willard Edmund Caldwell, *Professor Emeritus of Psychology*
B.A. 1940, M.A. 1941, University of Florida; Ph.D. 1946, Cornell University

Ali Bulent Cambel, *Professor Emeritus of Engineering and Applied Science*
B.S. 1942, Robert College, Turkey; M.S. 1946, California Institute of Technology; Ph.D. 1950, University of Iowa

James Harold Coberly, *Professor Emeritus of English*
B.A. 1933, M.A. 1938, Ph.D. 1949, George Washington University

Mary Ann Bieter Coffland, *Associate Professor Emeritus of Romance Languages*
B.A. 1952, College of St. Catherine; M.A. 1957, Ph.D. 1965, University of Minnesota

Victor Hugo Cohn, *Professor Emeritus of Pharmacology*
B.S. 1952, Lehigh University; M.A. 1954, Harvard University; Ph.D. 1961, George Washington University

Mary Ellen Coleman, *Professor Emeritus of Education*
B.S. 1937, Madison College; M.A. in Ed. 1950, George Washington University

James Fearing Dinwiddie, *Professor Emeritus of Engineering Management*
B.S. 1948, Carnegie Institute of Technology; M.S. 1956, North Carolina State University; M.S. 1966, Ph.D. 1972, Stanford University

Roy Brandon Eastin, *Professor Emeritus of Business Administration*
B.A. 1943, M.A. 1945, George Washington University; Ph.D. 1954, American University

John Eftis, *Professor Emeritus of Engineering and Applied Science*
B.C.E. 1952, City University of New York, City College; M.S. in C.E. 1956, Columbia University; D.Sc. 1967, George Washington University

Marvin F. Eisenberg, *Professor Emeritus of Engineering and Applied Science*
B.S. in I.E. 1954, University of Miami; M.S. in Engr. 1954, Ph.D. 1961, University of Florida; P.E.

Julian Eisenstein, *Professor Emeritus of Physics*
B.S. 1941, M.A. 1942, Ph.D. 1948, Harvard University

Rodney Walter Eldridge, *Professor Emeritus of International Finance*
B.A. 1949, M.A. 1959, University of Vermont; Ph.D. 1966, Columbia University

Lloyd Hartman Elliott, *Professor Emeritus of Higher Education; President Emeritus of the University*
B.A. 1937, Glenville State College; M.A. 1939, LL.D. 1967, West Virginia University; Ed.D. 1948, University of Colorado; LL.D. 1963, University of New Hampshire; L.L.D. 1965, Cabo College; LL.D. 1966, Concord College; LL.D. 1969, University of Maine at Orono; LL.D. 1970, Hyosei College; LL.D. 1971, Georgetown University; Litt.D. 1986, West Virginia Institute of Technology; D.H.C. 1986, Kansai University, Japan; LL.D. 1988, American University

Donald Michael Esterling, *Professor Emeritus of Engineering*
B.S. 1954, University of Notre Dame; M.A. 1966, Ph.D. 1968, Brandeis University

James Elmer Feir, *Professor Emeritus of Civil Engineering*
B.S. 1950, University of Alberta, Canada; M.S. 1955, University of London; Ph.D. 1966, Cambridge University

Anthony Vincent Fiacco, *Professor Emeritus of Operations Research and Applied Science*
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B.S.B.A. 1983, M.B.A. 1984, University of Louisville; Ph.D. 1991, Indiana University

James Willson-Quayle, *Assistant Professor of Political Science*
B.A. 1984, M.A. 1986, San Francisco State University; Ph.D. 1991, University of London, England

Erik Kenelm Winslow, *Professor of Behavioral Sciences*
B.S. 1963, Pennsylvania State University; M.S. 1965, Ph.D. 1967, Case Western Reserve University

Philip William Wirtz, *Professor of Management Science and of Psychology*
B.A. 1971, Ph.D. 1983, George Washington University; M.S. 1974, Purdue University

Maida Rust Withers, *Professor of Dance*
B.A. 1958, Brigham Young University; M.S. 1960, University of Utah

Thomas Richard Wolanin, *Adjunct Professor of Education Policy*
B.A. 1965, Oberlin College; M.A. 1970, Ph.D. 1972, Harvard University

Sharon Lee Wolchik, *Professor of Political Science and International Affairs*
B.A. 1970, Syracuse University; M.A. 1972, Indiana University; Ph.D. 1978, University of Michigan

Alfred Abraham Wolf, *Professorial Lecturer in Engineering*
B.S.(E.E.) 1948, Drexel University; M.S.(E.E.) 1954, Ph.D. 1958, University of Pennsylvania; Sc.D. 1977, M.D. 1978, University of Juarez, Mexico

Stacy Wolf, *Assistant Professor of English and of Theatre and Dance*
B.A. 1984, Yale University; M.A. 1989, University of Virginia; Ph.D. 1994, University of Wisconsin

Alexandria Lee Wollman, *Clinical Instructor in Art Therapy*
B.F.A. 1983, University of Georgia; M.A. 1985, George Washington University

Bernard Wood, *Henry R. Luce Professor in Human Origins; Professor of Human Evolutionary Anatomy*
B.Sc. 1966, M.B., B.Sc. 1969, Ph.D. 1975, University of London, England

Karren Ikeda Wood, *Adjunct Instructor in Special Education*
B.A. 1964, Smith College; M.Ed. 1983, George Mason University; Ed.S. 1989, George Washington University

Pamela Jane Woodruff, *Lecturer in Psychology*
B.A. 1976, George Washington University

William Thomas Woodward, *Professor of Painting*
B.A. 1957, M.A. 1961, American University

Michael J. Worth, *Professor of Education; Vice President for Development and Alumni Affairs*
B.A. 1960, Wilkes College; M.A. 1970, American University; Ph.D. 1982, University of Maryland

John Franklin Wright, Jr., *Professor of Drawing and Graphics*
B.A. 1954, American University; M.A. 1960, University of Illinois

John R. Wright, *Professor of Political Science*
B.A. 1956, M.A. 1978, Northern Illinois University; M.A. 1981, Ph.D. 1983, University of Rochester

Phyllis E. Wright, *Assistant Professorial Lecturer in Art*
B.F.A. 1979, Carnegie-Mellon University; M.F.A. 1982, George Washington University

Jeremy S. Wu, *Professorial Lecturer in Statistics*
B.A. 1974, M.A. 1976, Ph.D. 1983, George Washington University

Mavis L. Wylie, *Assistant Professorial Lecturer in Clinical Psychology*
B.A. 1964, Wellesley College; M.A. 1976, Ph.D. 1988, George Washington University

Lan Xue, *Assistant Professor of Engineering Management and International Affairs*
B.E. 1982, Changchun Institute of Optics and Fine Mechanics, China; M.S. 1986, M.S. 1987, State University of New York at Stony Brook; Ph.D. 1991, Carnegie-Mellon University

Michael Yachmis, *Adjunct Professor of Engineering*
B.S. 1943, Military Academy, Greece; M.S. 1956, M.E.A. 1962, D.Sc. 1968, George Washington University

Susan Yaffe-Oziel, *Clinical Instructor in Speech and Hearing*
B.S. 1976, Emerson College; M.M.S. 1978, Emory University

Chi Yang, *Assistant Research Professor of Engineering and Applied Science*
B.S. 1982, Ph.D. 1988, Shanghai Jiao Tong University, China

Daqing Yang, *Assistant Professor of History and International Affairs*
B.A. 1987, Nanjing University, China; M.A. 1989, University of Hawaii; M.A. 1990, University of Chicago; Ph.D. 1996, Harvard University

Jiawen Yang, *Assistant Professor of International Business*
B.A. 1975, M.A. 1984, University of International Business and Economics, China; Ph.D. 1994, New York University

Cheryl Watkins Yates, *Adjunct Assistant Professor of Special Education*
B.S. 1977, Fayetteville State College; M.A. 1987, University of Maryland; Ed.S. 1992, Ed.D. 1994, George Washington University

Harry Elwood Yeide, Jr., *Professor of Religion*
B.A. 1956, Williams College; B.D. 1957, Union Theological Seminary; Ph.D. 1966, Harvard University

Anthony Marvin Yezer, *Professor of Economics*
B.S. 1966, Dartmouth College; M.S. 1967, London School of Economics and Political Science; Ph.D. 1974, Massachusetts Institute of Technology

Ellen Davis Yorke, *Professor of Radiology*
B.A. 1962, Barnard College; M.A. 1963, Columbia University; Ph.D. 1967, University of Maryland

Victoria Youcha, *Assistant Professor of Special Education*
Ed.D. 1990, George Washington University

Laura S. Youens, *Associate Professor of Music*
B.Mus. 1969, Southwestern University; M.Mus. 1973, Ph.D. 1978, Indiana University

Naji Younes, *Assistant Research Professor of Statistics*
B.A. 1983, M.A. 1986, Ph.D. 1994, George Washington University

Abdou Youssef, *Associate Professor of Engineering and Applied Science*
B.S. 1981, B.S. 1982, Lebanese University; M.A. 1985, Ph.D. 1988, Princeton University

Liang Yu, *Associate Professor of Tourism and Hotel Management*
B.A. 1980, Hangzhow University, China; Ed.M. 1984, Boston University; Ph.D. 1988, University of Oregon

Mona Elwakkad Zaghloul, *Professor of Engineering and Applied Science*
B.S.(E.E.) 1965, Cairo University, Egypt; M.S.(E.E.) 1970, M.Math. 1971, Ph.D. 1975, University of Waterloo, Canada

Abbas Zaidi, *Instructor in Management Science*
B.A. 1993, George Mason University

David Laster Zalkind, *Associate Professor of Quantitative Methods and Management Information*
B.A. 1967, Harvard University; M.S. 1968, Stanford University; Ph.D. 1972, Johns Hopkins University

Richard Bruce Zamoff, *Adjunct Associate Professor of Sociology*
B.A. 1961, M.A. 1963, Ph.D. 1968, Columbia University

Michele Zavos, *Associate Professorial Lecturer in Women's Studies*
B.A. 1974, University of Wisconsin; J.D. 1979, Catholic University of America

Maria Cecilia Zea, *Associate Professor of Psychology*
Psychologist 1981, Pontificia Universidad Javeriana, Colombia; M.A. 1987, Ph.D. 1990, University of Maryland

Joseph Zeidner, *Professor of Administrative Sciences and of Psychology*
B.S. 1949, City University of New York, City College; M.A. 1951, Fordham University; Ph.D. 1955, Catholic University of America

Langche Zeng, *Assistant Professor of Political Science*
B.S. 1982, Chengdu University of Science and Technology, China; M.A. 1985, Sichuan Institute of Finance and Economics, China; M.S. 1990, Ph.D. 1993, California Institute of Technology

Robert Mayer Zeskind, *Professorial Lecturer in Engineering*
B.S. 1965, M.S. 1968, D.Sc. 1973, George Washington University

Anna Yaohui Zhao, *Assistant Professor of Economics and International Affairs*
B.A. 1985, M.A. 1987, Beijing University, China; Ph.D. 1995, University of Chicago

Chunmiao Zheng, *Assistant Professorial Lecturer in Geology*
B.S. 1983, Chengdu College of Geology, China; Ph.D. 1988, University of Wisconsin

Samuel Leo Zimmerman, *Associate Professorial Lecturer in Engineering*
B.C.E. 1969, M.C.E. 1970, Cornell University

John Edmund Ziolkowski, *Professor of Classics*
B.A. 1958, Duke University; Ph.D. 1963, University of North Carolina

Artley Joseph Zuchelli, *Professor of Physics*
B.A. 1955, Ph.D. 1958, University of Virginia

ADMISSIONS

The University accepts applications for admission each semester and summer session. Admission is based on evidence of potential for successful study and on available space in the entering class. The following criteria are considered: the strength of the courses taken and the grades achieved in secondary school and/or college, standardized test scores, relationship between grades and test scores, essays, recommendations, and extracurricular activities.

Admission Procedure

The application for admission to degree candidacy has two parts. The Application: Part I should be requested well in advance of the semester for which the student seeks admission; specific dates are given in the section below. The Application: Part II is mailed to the applicant after receipt of Part I. Application forms should be requested from and returned to the Office of Admissions, The George Washington University, Washington, D.C. 20052. A $55 application fee is charged.

Secondary School Students

Freshmen—Regular Decision

Preference for places in the entering class will be given to students who submit the Application: Part 1 by December 1 and Part 2 with required credentials by February 1. Students who wish to begin college in the spring semester should submit Part 1 of the application by October 1 and Part 2 by November 1.

Applicants from secondary schools must arrange to have sent directly from their schools to the Office of Admissions a complete academic record together with a teacher and a counselor recommendation. This information should be supplied on the appropriate forms in the application packet. Before enrolling, incoming freshmen must provide a complete high school record showing final grades and graduation.

Entrance Examinations—Applicants from secondary schools must submit scores on the College Board Scholastic Assessment Test (SAT I) or on the American College Testing (ACT) battery. Submission of scores on College Board SAT II in writing and mathematics is recommended. Score reports must be sent directly to the Office of Admissions from the testing agency.

Freshmen—Early Decision

High school seniors applying for fall admission as full-time freshmen with The George Washington University as their first choice may wish to take advantage of the Early Decision option. To apply for Early Decision, submit the Application: Part 1 by November 1 and Part 2 with supporting credentials by December 1; we will mail our decision by mid-December. If accepted, you are required to send in your declaration of intent to attend GW, together with appropriate deposits, no later than January 15 and to withdraw all applications for admission to other colleges and universities.

Freshmen—Early Admission Plan

Exceptionally well-prepared students who will complete the junior year in high school may apply for early admission. This plan is designed for students with the emotional maturity, as well as the academic ability and background necessary for college entrance. In most cases, applicants accepted for early admission have exhausted academic offerings in secondary school to the extent that remaining for the senior year may not be in the best interests of the students.

To be considered for early admission, students must

1. demonstrate superior academic performance through the junior year of high school;
2. meet the entrance requirements of the school or division applied to, by completing all required entrance units with the possible exception of the fourth year of English;
3. have the unqualified recommendation of the secondary school principal or counselor;
4. submit two letters of recommendation (in addition to the counselor's) from teachers who can testify to the student's maturity and general readiness to enter college;
5. submit a letter from a parent or guardian supporting early college entrance;
6. take SAT I or ACT plus SAT II subject tests in writing and mathematics and one other SAT II subject test (of the student's choice) and arrange to have the scores sent directly to the Office of Admissions by the testing agency;
7. arrange for an interview with an admissions officer.

Transfer Students

To be considered for fall admission, undergraduate students from other institutions should submit the Application: Part 1 by May 1 and Part 2 with required credentials by June 1. Corresponding dates for spring are October 1 and November 1; for summer, March 1 and April 1.

A transfer applicant should be in good standing as to scholarship and conduct at all postsecondary institutions previously attended. An applicant who has attended one or more institutions of higher education must request each registrar to mail directly to the Office of Admissions a transcript of his or her record, even if credits were not earned or if advanced standing is not desired. In addition, an applicant must have his or her high school record and College Board or ACT test scores sent to the Office of Admissions directly from the high school and testing agency. For more detailed transfer admission requirements, see the appropriate school in this Bulletin.

Students from Foreign Institutions

Applications, required records, and scores on the Test of English as a Foreign Language (see below) should be received from international students no later than February 1 for the fall semester and October 1 for the spring semester.

Required Records

At the time the application is sent, students must have the educational institutions previously attended send directly to the GW Office of Admissions copies of official certificates and records listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from all secondary schools, colleges, and universities attended are required. Records of state examinations and certificates are also required. These records become the property of the University and cannot be returned.

These documents should be in the language in which the institution keeps its official records. If they are in a language other than English, the copies submitted should be accompanied by a certified English translation.

Language Tests

All applicants from countries where English is not an official language are required to take the Test of English as a Foreign Language (TOEFL), preferably with the Test of Written English (TWE). The University looks for a TOEFL score of 550 or above in considering candidates for admission. (The School of Bu-

ness and Public Management requires a minimum score of 600 on a second taking of the TOEFL.) Applicants are responsible for making arrangements to take the test by addressing inquiries to TOEFL, P.O. Box 6151, Princeton, N.J. 08541–6151. The completed registration form must be returned well in advance of the semester for which admission is sought. On the application for the TOEFL, students should specify that the scores be sent to the GW Office of Admissions.

Admitted students from countries where English is not an official language are also required to take an English as a Foreign Language placement test prior to registering at the University; the placement test is waived for students with a TOEFL score of at least 600. Depending on the results of this test, the student's academic program may be restricted in number and type of courses that can be taken. Students who are required to take English as a Foreign Language courses at an intensive level might not be able to take other courses during that semester. College credit is not granted for English study below the level of standard freshman English courses.

Financial Certificate

A Financial Certificate and Bank Letter must be completed and submitted with the application for admission of all international students planning to study at the University under the authorization of either a student (F) or exchange visitor (J) visa. Satisfactory completion and submission of the Financial Certificate and Bank Letter are required for the issuance of a Form I-20 or IAP-66.

Readmission

Previously registered students who wish to resume studies on campus after discontinuing enrollment for one or more semesters (summer sessions excluded) must apply for readmission. Deadlines for readmission applications from students in good academic standing are the same as those for transfer students. Students seeking readmission after having attended other institutions of higher education in the interim must have complete official transcripts sent to the Office of Admissions from all other institutions attended. Students seeking readmission as degree candidates after previous enrollment in nondegree status must submit a standard undergraduate degree application and fee, together with all entrance credentials not previously received or required.

Applicants for readmission are subject to the University regulations in effect at the time of readmission.

The application fee is waived for students applying for readmission after previous enrollment as degree candidates at this University if they have not since registered at another institution.

Tuition/Orientation Deposit

After notification of acceptance, a tuition/orientation deposit will be required of all new full-time undergraduate students. This deposit is due May 1 for freshmen entering in the summer or fall semester; it is usually due two weeks after admission for transfer students. The deposit is credited toward tuition and orientation and is not refundable. Full-time readmitted students are required to submit a tuition deposit that is usually due two weeks after admission.

Advanced Standing and Advanced Placement

Advanced Placement or Waiver by Examination

Advanced placement or waiver of a requirement will be granted on the basis of scores College Board SAT II subject tests as follows:

Subject Test	Minimum Score	Exemption
American history	650	Waives Hist 71–72
Writing	710	Waives Engl 10
French, Spanish	690	Waives a two-year language requirement
German, Latin	630	
Hebrew	570	

These numbers reflect recentered scores. A score of 28 or above on the ACT English Usage Test will waive English 10. Advanced standing (academic credit is not assigned on the basis of SAT I or II or ACT results.

Credit from Other Institutions of Higher Learning

Where there is no duplication involved, either through course work or examination, credit may be granted for work successfully completed at other institutions of higher learning. Assignment of transfer credit will depend on the appropriateness of the courses completed elsewhere, the standing of the institution at which the previous work was completed, and the regulations of the division of this University in which the credit is to be applied toward a degree. Transfer credit must satisfy the requirements for the degree sought as stated in this Bulletin. Credit may be accepted provisionally or may require validation by examination or completion of higher-level courses in the same sequence. Transfer credit will not be assigned for courses completed with a low-pass grade (D or the equivalent); course work completed in vocational/technical programs (e.g., secretarial studies); or sub-freshman-level remedial work.

In Columbian School of Arts and Sciences, credit assigned for professional courses (those in engineering, education, or business) is limited to 18 credit hours. In the School of Business and Public Management, there is a limitation of 3 credit hours per course to be assigned for work completed at another institution; students transferring to that school from two-year colleges will receive no more than 60 credit hours to be applied to their degree program. Columbian School of Arts and Sciences and the Elliott School of International Affairs accept a maximum of 66 credit hours from two-year colleges. All transfer students must satisfy the residence and course requirements for degrees sought at the University.

Credit by Examination, from Service Schools, from Noncollegiate Organizations, and by Nontraditional Methods

Assuming there is no duplication of course work, a maximum of 30 credit hours may be assigned upon admission to the University for any combination of the following except as noted below.

College Board Advanced Placement (AP) Tests—On the basis of a score report sent to the Office of Admissions from the Educational Testing Service at the student's request, undergraduate credit is assigned for scores of four or five on Advanced Placement Tests. Test scores below four are not accepted for assignment of academic credit. The Advanced Placement Tests are administered in the secondary schools in May of each year. Normally only students who complete a course designated as Advanced Placement are prepared for the examination. Students should arrange for the examination through the secondary school attended or with the College Board, Advanced Placement Tests, CN 6671, Princeton, N.J. 08541–6671.

College Board College-Level Examination Program (CLEP)—CLEP offers two types of examinations: General and Subject Examinations. CLEP General Examinations are offered in five areas: English composition, humanities, mathematics, natural sciences, and social sciences and history. CLEP Subject Examinations measure achievement in specific college-level courses and are offered in

subjects. Students should arrange for the examinations with the College Board, College-Level Examination Program, CN 6601, Princeton, N.J. 08541–6601.

With the exception of the English composition examination, credit is assigned for the General Examinations passed at approximately the 50th percentile or above. In the School of Business and Public Management, credit is not assigned for the mathematics examination. In the School of Engineering and Applied Science, credit is not assigned for the mathematics or natural sciences examinations.

Credit is assigned, with some exceptions, for the Subject Examinations passed at the level recommended in the College Board model policy. Credit for the CLEP Subject Examinations may not be earned by passing the examination after having taken an equivalent college-level course. See the School of Business and Public Management for specific restrictions on CLEP credit for applicants to that school.

Special Departmental Examinations for Undergraduates—Credit may be assigned for Special Departmental Examinations administered by Columbian School departments to students enrolled in all undergraduate divisions of the University.

International Baccalaureate—GW awards 6 to 8 credit hours for Higher-level scores of 4 and above with the exception of English language. Students who have passed English A1 with a grade of 6 or 7 will receive 6 credit hours for Literature; for a grade of 4 or 5, students will receive 3 credit hours. No credit will be assigned for English B or for subsidiary-level examination scores.

Credit Earned Through USAFI and DANTES—Except to students enrolled in the School of Business and Public Management, credit is assigned for approved United States Armed Forces Institute (USAFI) and Defense Activity for Non-traditional Education Support (DANTES) courses.

Credit from Service Schools—Except to undergraduates admitted to the School of Business and Public Management, a limited amount of credit may be assigned for selected service school courses.

Credit for Courses Offered Through Correspondence and Television—Except to undergraduates admitted to the School of Business and Public Management, a limited amount of credit may be assigned for selected courses taught by non-traditional methods, provided that such courses require the student's physical presence during a monitored final examination. Assignment of such credit will require a statement from the sponsoring agency that such an examination was a required part of the course.

Division of University Programs

The Office of University Students in the Division of University Programs makes on-campus credit courses available to nondegree students. Students who need the approval of the Office of Admissions to register will be so informed when they call to register. Application forms are available from and should be returned to the Office of Admissions. There is no fee for applying to this Division. For detailed entrance requirements, see Office of University Students under Division of University Programs in this Bulletin.

SPECIAL PROGRAMS

Secondary Fields of Study

A program of secondary fields of study has been established within the University to provide opportunities for formal interschool study. Students must be enrolled in a degree program and must be in good academic standing to be eligible to take a secondary field in another school. The secondary fields generally consist of 12 to 18 hours of prescribed courses, depending on the field, with scholarship requirements determined by the school offering the field. Upon satisfactory completion of all requirements, the title of the secondary field of study and the courses taken in support of the field are entered on the student's transcript. For further information, see the brochure "Secondary Fields of Study" available in the offices of the deans or from the Vice President for Academic Affairs.

University Honors Program

The University began its undergraduate honors program in 1990. Columbian School of Arts and Sciences, the Elliott School of International Affairs, the School of Business and Public Management, and the School of Engineering and Applied Science participate in the University Honors Program. Through the office of the Vice President for Academic Affairs, the program offers a University Symposium for the entire University community and honors courses and special events for students in the program. Honors courses are listed in the *Schedule of Classes.*

Students must apply for admission to the University Honors Program. Generally, entering freshmen will have high SAT scores and be at or near the top of their high school classes. Applications from other promising students of unusual talent will be seriously considered. Current GW students may apply for entrance to the program.

To remain in the program and to graduate with recognition from the program, students must meet specific grade-point average requirements that increase in successive years.

Honor Societies

Honor societies that maintain active chapters at George Washington University include Phi Beta Kappa and Sigma Xi as well as those specific to given academic fields, such as Alpha Epsilon Delta, Beta Alpha Psi, Beta Gamma Sigma, Delta Phi Alpha, Eta Kappa Nu, Omicron Delta Epsilon, Omega Rho, Pi Alpha Alpha, Pi Sigma Alpha, Pi Tau Sigma, Psi Chi, Sigma Delta Pi, Sigma Iota Rho, and Tau Beta Pi. The freshman honor society Phi Eta Sigma is open to qualified students in all undergraduate programs.

Study Abroad Programs

Students who wish to study abroad during the academic year should check with the office of the dean of their school or the Office for Study Abroad. Credits earned with acceptable grades are transferable toward the appropriate degree at George Washington University, provided there is no duplication of work taken previously. All programs of study abroad must be approved on the required forms by the appropriate faculty and administrative personnel before departure. In addition to academic year programs, study abroad is available at varying locations during the summer. Information on summer programs abroad is available in the GW Summer Sessions Announcement.

Joint Degree Programs

Several joint degree programs are available to undergraduates. Five-year bachelor's/master's programs include the B.S./M.A. in economics, the B.S./M.S. in systems analysis and engineering/operations research or engineering management, the B.S./M.A. in systems analysis and engineering/economics, the B.S./M.S. in economics/operations research or engineering management, the B.A./M.A. in art or psychology/art therapy, the B.S./M.S. in chemical toxicology (chemistry/forensic sciences), the B.B.A./M.T.A., and the B.B.A./M.P.A. See the department or school concerned for specific program requirements.

Two joint degree programs are available for study toward the Doctor of Medicine degree: the integrated B.A./M.D. program described under Columbian School of Arts and Sciences, and the early selection program described under the School of Medicine and Health Sciences.

ROTC

See Naval Science under Courses of Instruction for the NROTC program at George Washington University.

George Washington University students may enroll through the Consortium in the Army ROTC program offered at Georgetown University, the AFROTC program at the University of Maryland, or the Army ROTC or AFROTC at Howard University. Scholarships are available. Those interested should contact the ROTC enrollment officer at one of these universities. Limited credit for such courses (primarily advanced ROTC) may be assigned for electives to meet degree requirements at George Washington University; prior approval is required by the dean of the school in which the student is enrolled.

DIVISION OF UNIVERSITY PROGRAMS

Introduction

The Division of University Programs administers the University's off-campus credit courses and degree programs. The Division also offers noncredit certificate programs, courses, and workshops through the Center for Career Education. The staff of instruction for Division programs includes members of the full-time faculty of the University and academically qualified adjunct faculty from the professional community selected by the academic departments and schools.

Office of University Students

The Office of University Students (OUS) makes on-campus credit courses available to those who are not currently degree candidates at this University. Such students, often employed in government or industry, may be taking courses to enhance their career potential or as a matter of personal interest. They may be candidates for higher degrees at other institutions, sent here for special work as part of a graduate program. They may be undergraduates matriculated elsewhere, taking courses for transfer to their own institution.

All courses except those restricted to medical and law students are open to OUS students, provided there is room in the class and the student has sufficient preparation as determined by the academic departments.

Registration in a given course may be denied OUS students when space is needed for degree candidates. OUS students are not eligible to register for thesis or dissertation research nor for continuous enrollment or leave of absence. OUS requires a minimum registration of 3 credit hours per semester or session except in special circumstances as approved by the director.

Entrance Requirements

An academic background appropriate for the program of studies contemplated is required. In addition, the applicant who has previously attended this or another college or university must be in good standing at that institution. An applicant who has been suspended from any educational institution for poor scholarship will not be considered for admission for one calendar year after the effective date of the suspension. An applicant who has been denied undergraduate admission within this University will not be considered for admission as a nondegree student for the same semester for which the application was denied.

Applications for admission through OUS for a fall or spring semester are necessary for high school students and for international students; the applications should be obtained from and returned to the Office of Admissions. There is an application fee. For admission requirements for students from foreign institutions, see Admissions. For information on registration, please refer to the *Schedule of Classes*.

Regulations

See Admissions, Fees and Financial Regulations, and University Regulations. Prospective and registered students are urged to acquaint themselves with the regulations concerning attendance and withdrawal under University Regulations. The following specifically apply to all students registered through OUS:

Last day to add a class for credit—end of second week of classes.
Last day to drop a class for credit or to withdraw from the University—end of the seventh week of classes.
Equivalent amounts of time apply to the summer sessions.

Academic Work Load

For OUS students, the normal academic work load during the regular academic year is not more than 10 credit hours for a student employed more than 20 hours per week and not more than 18 credit hours for a full-time student. During the summer a student may take a maximum of two courses during any one session. Exceptions to these limits must be approved by the dean.

Scholarship Requirements

A student who fails to maintain the scholarship requirements of OUS may be dismissed from the University. A statement of scholarship requirements is available in the office of the director. All grades received in OUS remain on record; scholarship requirements are based on the total record.

Grades—See Scholarship Requirements under University Regulations. There is no limitation on the number of courses that may be taken on a pass-no pass basis in OUS, however, there may be a limit on the number that can be transferred to fulfill degree requirements.

Incomplete/Authorized Withdrawal

Conditions under which the grades of *I* (Incomplete) and *W* (Authorized Withdrawal) may be assigned are described under University Regulations.

Changing an Incomplete—The instructor normally sets a period (maximum of one year) within which the uncompleted work must be made up. An Incomplete that is not changed within one calendar year remains as a grade of *I* on the student's record.

Change in Program of Studies

Change Within the Office of University Students—A student may not change status to that of auditor except with the approval of the dean (see Withdrawal under University Regulations).

Transfer Within the University—Transfer to or from OUS may be made only with the approval of the deans concerned. Application for transfer to degree candidacy will be considered only after the completion of at least one semester in OUS or upon request from the college or school to which the student is seeking admission. Students wishing to transfer to degree candidacy must meet the conditions of the college or school to which they are applying. It is the responsibility of the student to consult the college or school concerning conditions to be met and the amount of work transferable.

College Courses for Secondary School Students

Under the auspices of the Office of University Students, well-qualified secondary school students may take college courses for credit in nondegree status at George Washington University. During the academic year, high school juniors and seniors residing in the Washington metropolitan area may enroll in GW courses as part-time, commuting students. For further information and an application, please write to the Coordinator, College Courses for Secondary School Students, Office of Admissions, George Washington University, Washington, D.C. 20052.

SUMMER SESSIONS

Through the Office of Summer, Special, and International Programs, courses are offered during the summer by all degree-granting divisions of the University. During the summer the University also offers special programs that are not available during the regular academic year. Courses are offered during both day and evening hours. Students who are enrolled at the University for the spring semester may register for the following Summer Sessions without special application. Those who wish degree status may seek admission from the appropriate school within the University. Those who do not wish to work toward a degree at the University may apply through the "Quick Entry" process described in the Summer Sessions Announcement. For a complete statement concerning summer term work, see the Summer Sessions Announcement.

STUDENT SERVICES

Office of the Dean of Students

The Office of the Dean of Students provides counseling and information for students, administers the nonacademic student disciplinary system and student grievance procedures, assists students in resolving complex issues, and supports nonacademic program development. Staff members are well informed on University policies and the various student services provided on campus, enabling them to provide referrals and answers to many questions concerning general student life. Personal letters of recommendation for students applying to graduate and professional schools can be obtained from this office. The Office of the Dean of Students oversees the Community Living and Learning Center.

Campus Housing

Complete information concerning the University's residence halls is available from the GW Community Living and Learning Center. The Center offers safe residence hall facilities and a diverse range of community living environments and student development programs. Contained within the Center are the areas of Student Judicial Services and Substance Abuse Prevention.

Admission to the University does not include a room reservation. The student will receive, with the notification of acceptance, University residence hall information, an application for residence hall space or apartment accommodation, and a declaration of intent to attend the University. The application for residence hall space or apartment accommodation must be accompanied by a $ *nonrefundable deposit*. The housing deposit is credited toward the first semester's room or apartment charge.

Rooms and apartments are leased for the academic year, with assignments on a first-come, first-served basis. Lease payment must be made in early June for the fall semester, unless the student elects the 10-month payment plan. Please check with Student Accounts for details regarding the 10-month payment plan.

Charges for residence hall space are determined by hall and room size, with the 1997–98 most prevalent cost set at $4,590 for the academic year. In the apartment halls the 1997–98 most prevalent charge per student is set at $5,443 for the academic year, with prices ranging higher and lower according to the space provided. Exact costs for the 1998-99 academic year will be announced

Food Service

Freshmen and sophomores in residence halls are required to choose a food service plan. Freshmen choose from a number of plans (including a kosher meal plan) that range from $2,020 to $3,121 for the 1997–98 academic year. Sophomores choose from a more extensive range of food service plans. At a later date costs for the 1998–99 academic year will be announced by the Department of Auxiliary and Institutional Services, which operates food service at the University.

Student Health Service

The Student Health Service is an outpatient clinic staffed by physicians, nurse practitioners, and physician assistants who can evaluate and treat most students' medical problems. Visits should be arranged by appointment; urgent problems may be seen on a walk-in basis if necessary. Charges may be assessed for labwork, immunizations, allergy injections, supplies, and medications. Psychiatric evaluation and short-term therapy appointments and crisis intervention are available. Health education and outreach programs on a variety of topics are provided throughout the year.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. All fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and continuing education programs are not eligible. Bills incurred from all services rendered outside of the Student Health Service (for example, x-ray work, laboratory work, and office visits to private physicians) are the responsibility of the student.

Health and Accident Insurance

The University recommends that all students be covered by health and accident insurance. For information on group health insurance options offered through the University, students should contact the Student Health Service or Office of the Dean of Students.

University Counseling Center

The University Counseling Center was established to help students resolve personal, social, career, and study problems that can interfere with their academic success. Services include workshops and groups on topics that include time management, study skills, procrastination prevention, family and interpersonal issues, choosing a major or career, stress management, conflict management, and self-esteem; clinical services, including crisis intervention, brief personal counseling, and referral assistance; and consultation and training programs for student, faculty, and staff groups. Career counseling and referral services are available to GW students, faculty, staff, alumni, and individuals from the greater Washington community.

The Speech and Hearing Center

The Speech and Hearing Center provides diagnosis and treatment of a wide range of speech, language, and hearing disorders. These include developmental impairments of articulation and language, stuttering, voice disorders, and speech and language impairments resulting from neurological damage. Services are available for persons wishing to modify a regional dialect or foreign accent. Evaluation and aural rehabilitation are also provided for hearing-impaired individuals. The Speech and Hearing Center operates in conjunction with the Department of Speech and Hearing.

The Writing Center

In conjunction with the Department of English, the Writing Center provides writing instruction to GW students at all levels of experience and expertise. Students are assisted in identifying writing problems and learning how best to express ideas. Trained tutors (undergraduate peer tutors, graduate students, and the director and other members of the faculty) work with students individually on areas of specific need or interest. Tutors provide assistance in such areas as organizing a mass of information efficiently and clearly, using correct grammar and punctuation, getting started on a writing project, developing a thesis, providing evidence in support of an argument, and presenting the findings of an experiment or the solution to a research problem.

Computer Information and Resource Center

The Computer Information Resource Center (CIRC) provides computer facilities, technical assistance, and information on the use of computers and computer networks. CIRC supports IBM–PC, Apple Macintosh, and Unix. The CIRC

computer laboratories are open seven days a week, 24 hours a day. CIRC also maintains computer classrooms on campus; students generally have access to these rooms when classes are not in session. The George Washington Information System provides information about the campus plus reseach and information resources from around the globe on the Internet.

In cooperation with the Gelman Library and GW Television, CIRC publishes a periodic newsletter on computing issues. CIRC gives seminars and offers technical advice to faculty and students regarding use of Windows and Macintosh personal computers, Unix computers, and HTML. Students and faculty may receive assistance from GW's nonprofit computer store for microcomputer selection and acquisition.

Any University student may have access to the computer facilities for individual research, class projects, and thesis or dissertation study.

Career Center

The Career Center promotes effective career planning, teaches job search strategies, and facilitates contacts between GW students, alumni, and prospective employers through its many services. Services include full- and part-time job listings; internship listings; career consulting; workshops (including Job Search Strategies, Letters and Resumes, Effective Interviewing); a career resource library; campus interviewing; a resume referral service; resume critiques; cooperative education; student employment; RESUMIX services; computer- and Internet-based job resources; and a credentials service that supports graduate/professional school applications.

International Services Office

The International Services Office, overseen by Special Services within Student and Academic Support Services, provides services to GW's international students, scholars, faculty, and staff. The office provides advising on a variety of personal issues, including cultural adjustment, living conditions, academic concerns, and finances; provides immigration assistance and information on U.S. government requirements and regulations specific to the international community; conducts orientation programs to assist in living, studying, and working in the United States; and serves as a resource center for the University community on issues of cross-cultural understanding.

Disability Support Services

The Disability Support Services Office, overseen by Special Services within Student and Academic Support Services, works to assure that the special services necessary for disabled students to participate fully in their academic programs and the extracurricular life of the campus are provided for them through University or community resources.

Multicultural Student Services Center

The Multicultural Student Services Center, overseen by Special Services within Student and Academic Support Services, provides academic, co-curricular, and personal support services for all GW minority students to enhance minority student life at GW. Through the Center, minority students receive orientation to various University resources, and are made aware of the many cultural activities and programs that exist on campus and in the greater metropolitan area. The Center provides professional and peer counseling, course advising, tutorial services, and campus and community mentoring programs. The staff is available to address students' academic and personal concerns.

In addition, the Center enhances the quality of ethnic minority student life through the sponsoring of co-curricular activities and leadership training

Center houses a resource center with computers for student use, reference books and instructional materials, a test file, and an information center. The Multicultural Student Services Center oversees the Partners in Academics and Leadership Program (formerly the Educational Opportunity Program) and various preparatory and precollege programs.

Partners in Academics and Leadership Program

The Partners in Academics and Leadership Program, a component of the Multicultural Student Services Center, provides selected District of Columbia students with financial aid, academic support services, and personal advising to assist them in pursuing undergraduate work at George Washington University. The staff coordinates a precollege program as well as educational and cultural activities to promote the success and enhance the experience of program participants.

The staff administers the High School/College Internship Program (HI SCIP), which enrolls highly motivated District of Columbia high school seniors. Participants enroll at GW as nondegree candidates, taking a maximum of 6 credit hours per semester in addition to their high school curriculum. Application to the HI/SCIP program is made through the student's high school guidance office.

Student Activities Center

The Student Activities Center furthers the educational mission of the University by offering programs, services, and facilities that foster the social and cultural development and school spirit of members of the University community. Staff members assist individual students and campus organizations with event planning, program coordination, and participation in special projects.

Programs and activities include advisement of campus organizations, registration of student organizations, planning and coordination of major campus events, and oversight of Greek Affairs, Colonial Inauguration, the Presidential Administrative Fellows Program, band and cheerleading, and intramural and club sports. Additional information about the services offered by the Student Activities Center, and about the various student organizations and committees, can be obtained from the *Student Planner and Handbook*.

Program Board—The Program Board, composed chiefly of elected and appointed students, has the primary responsibility of allocating resources for student programming on campus. In addition, the Program Board provides funding for activities presented by various campus organizations and encourages student participation in program planning through involvement in committees on the arts, concerts, festivals, films, parties, political affairs, and public relations.

Student Government—The George Washington University Student Association is made up of all full-time and part-time undergraduate and graduate students who are registered for academic credit on campus. A body of elected and appointed individuals is responsible for representing the interests of students at the University. The Student Association provides various services for students, such as academic evaluations, test and syllabus files, and the Student Advocate Service.

Student involvement in the governance of the University is also possible through participation in various administrative and Faculty Senate committees, advisory councils of the schools and college, selected committees of the Board of Trustees, and specialized bodies, such as the Residence Hall Association, the Joint Food Services Board, and the Marvin Center Governing Board. This involvement has helped develop policies and programs beneficial to students and to the University community as a whole.

Student Organizations—Students are encouraged to become involved with existing student organizations or to initiate their own. There are approximately 270 registered organizations on campus, covering a broad spectrum of interests.

including academic, professional, international, cultural, political, service, sports, hobbies, recreational, religious, and meditative groups as well as social fraternities and sororities.

The Cloyd Heck Marvin Center

The Marvin Center is the GW campus community center. The Marvin Center offers programs, services, and facilities for students, faculty, staff, alumni, and University guests. The Center's wide range of facilities includes dining locations, a theatre, lounges, recreational facilities, study rooms, conference and meeting rooms, Information Center, Colonnade Gallery, travel agency, computer store, bookstore, and Student Organization Resource Center. The Marvin Center provides facilities for programs conducted by the University Program Board, by academic departments that include the performing arts, and by other University organizations. The operation of the Marvin Center is overseen by Administrative Services within Student and Academic Support Services.

The Marvin Center Governing Board, which oversees the Center's policies, is a representative body composed of students, faculty, staff, and alumni. The Board works closely with the Center's staff in the review and development of policies, guidelines, and procedures that direct the operation of the Center.

Religious Life

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the religious organizations of their own choice. Several religious bodies sponsor various groups and form a link between the University and the religious community. The advisors of the religious organizations are available for counseling and together constitute the Board of Chaplains to enhance religious life on campus. Religious services and special observances are also provided for the University community as announced.

Major Program Events

Art Exhibits—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Auditorium and in the Colonnade art gallery of the Marvin Center. Student art exhibits are presented each semester.

Concert Series—The Department of Music presents a series of concerts featuring faculty, guest, and student artists throughout each year. Other concerts are held regularly in the Marvin Center, Lisner Auditorium, and the Smith Center.

Dance—The GW Dance Company presents major concerts, informal student performances, experimental events, television appearances, and lecture-demonstrations. Students may audition to become company members and have the opportunity to choreograph, perform, and gain experience in the technical aspects of dance productions.

Glee Club, Jazz Band, and Orchestra—The University Glee Club, Jazz Band, and Orchestra are available to students either as credit courses or as co-curricular activities. All of these organizations present major performances to the University community several times a year, including regular winter and spring concerts.

International Programs—The International Student Society presents an annual international dinner in cooperation with foreign embassies and international restaurants. Other programs include regular forums and speakers on international topics.

Program Board—The University Program Board, through its various committees and in cooperation with other campus groups, regularly sponsors films, lectures, concerts, social activities, and special events.

Theatre—The University Theatre produces four or five major plays and musicals during the year on the proscenium/thrust stage in the Dorothy Betts Marvin Theatre. Additional works, including original and experimental plays, are produced in a more intimate studio theatre. Students can participate in all aspects of theatre and may receive credit toward their B.A. or M.F.A. degrees for some of their production work.

Athletics, Recreation, and Intramurals

The Charles E. Smith Center offers many facilities for student use, including courts for basketball, volleyball, and badminton; a jogging track; a swimming pool; gymnastics and weight rooms; racquetball and squash courts; and a sauna and lockers. In addition, the Student Activities Center sponsors a broad program of intramural and recreational activities held in the Smith Center and designed to accommodate various levels of skill, experience, and interest.

The University is a member of the National Collegiate Athletic Association (NCAA), the Eastern College Athletic Conference (ECAC), and the Atlantic 10 Conference. Its intercollegiate varsity teams compete against major universities throughout the region and nation in such sports as basketball, baseball, soccer, tennis, golf, cross-country, crew, swimming and diving, water polo, volleyball, and gymnastics.

FINANCIAL AID

George Washington University offers a program of financial assistance for undergraduates. Undergraduate aid consists of two basic types: awards for academic achievement or talent without reference to financial circumstances (merit scholarships) and scholarships, grants, loans, and employment based on academic achievement and demonstrated financial need. All undergraduate gift aid (institutional scholarships and grants and federal grants) requires that the recipient be working on the first undergraduate degree and be registered for a full-time course load on campus at GW. (Financial aid for study abroad is limited and depends on the type of program attended; applicants must attend a session on financial aid for study abroad.) Loans and resident assistantships not based on financial need are available. In general, continuation of undergraduate aid cannot extend beyond eight semesters, or the end of the senior year, or the number of credits sufficient to graduate, whichever comes first.

Gift aid (scholarships, grants, fellowships, assistantships, etc.) is taxable to the extent that it exceeds the allowable costs of tuition, fees, and required books and supplies or is dedicated to other costs, such as room and board. Federal grants may be taxable if, together with other gift assistance, they exceed the allowable costs. In the case of a student who is awarded tuition scholarships, grants, or awards from more than one source, the combined amount cannot exceed tuition charges; institutional aid will be adjusted to this limit.

In general, consideration for financial aid is restricted to students in good academic standing who meet the minimum grade point average for particular awards and are not financially encumbered by any other University office. Awards may be rescinded if satisfactory academic progress standards are not met. Applications for institutional or federal aid cannot be processed if the relevant tax returns have not been filed in accordance with the IRS Code. The University reserves the right to ask for documentation necessary to determine aid eligibility. Documents submitted as part of aid applications become the property of the University and cannot be returned. Federal regulations require

that the University report suspected cases of fraud or misrepresentation to the appropriate federal, state, and local authorities.

Information in this section is accurate at the time this Bulletin is prepared for press. Additional information is contained in the financial aid sourcebook and "Satisfactory Academic Progress" brochure available from the Office of Student Financial Assistance, The George Washington University, Washington, D.C. 20052. Future changes in federal regulations or institutional policies may alter the application requirements or program guidelines.

Merit Aid

The University has merit aid programs of scholarships and awards for students with superior academic credentials or talents. These programs are based entirely on merit, without regard to financial need. Renewal is dependent on satisfactory academic progress relevant to the specific award in at least 15 credit hours per semester, as stated on the back of the award letter. Merit scholarships, including GW-sponsored National Merit Awards, cannot be combined, except for the Valedictorian Award.

Presidential Academic Scholarships—for incoming freshmen. Partial tuition scholarships are awarded to finalists in national academic competitions such as National Merit, National Hispanic Scholars, and National Achievement for Outstanding Negro Students. Partial tuition awards are also available to other outstanding students, including students admitted to the University Honors Program and Presidential Science Scholars in Chemistry and Physics. Members of Phi Theta Kappa or Alpha Beta Gamma who are transferring from community or junior colleges and have achieved grade-point averages of 3.7 and above in 56 transferrable hours will be considered for partial tuition awards. A GPA of 2.7 (*B*−), exclusive of courses not counted toward graduation, is required for renewal of the aforementioned awards.

Merit scholarships are also available to students admitted to the seven-year integrated B.A./M.D. and the SEAS/M.D. program; offering a unique fixed-tuition plan, this arrangement allows families to plan and finance their student's undergraduate and medical education. These integrated programs require a GPA of 3.0 for renewal.

Presidential Arts Award—partial tuition awards for incoming freshmen who have shown promise in the fine arts and in music, theatre, or dance. A GPA of 2.7 (*B*−) and the recommendation of the relevant department is required for renewal.

Valedictorian Award—$2,500 scholarships are awarded to high school seniors who graduate first in their class and attend GW. This is a one time only award for the freshman year.

Presidential Achievement Scholarships—$5,000 awards (limit of $2,500 per semester) are available to continuing students who have achieved a cumulative GPA of 3.7 (*A*−) after completing 30 or more credit hours at GW and who are not receiving another merit award.

Awards for Phi Beta Kappa—$2,000 awards for the senior year are made to students who are elected to Phi Beta Kappa in their junior year and who are not receiving another merit scholarship.

Elliott Engineering Honor Scholarships—$10,000 awards are offered to outstanding incoming SEAS students with 30 or more transferable hours of credit and a minimum of 3 credits of college-level chemistry or physics and 6 credits of college-level calculus or higher math. Awards may be renewed by current recipients who maintain the required GPA of 3.0 in 15 credits per semester, provided the recipient is enrolled full time in an engineering curriculum. There is an option of an additional academic year immediately following graduation if the student is admitted to graduate study at the master's level.

Need-Based Aid

The University offers extensive programs of scholarships, grants, loans, and employment based upon demonstrated need. The University participates in the Federal Perkins Loan, Federal Pell Grant, Federal Supplemental Educational Opportunity Grant, Federal Family Education Loans, and the Federal Work–Study program. All applicants are required to file both the PROFILE and the Free Application for Federal Student Aid (FAFSA), designating GW to receive their information, and to supply copies of signed federal income tax returns and W2 forms for the current tax year for student and parents (if dependent). For family members employed by an international organization, a letter is required from the employer certifying salary and all benefits. Continuing students also need to submit a GW Financial Aid Application.

Incoming freshmen must file applications and supporting credentials for financial aid by January 31 for the next academic year; transfer students, by April 1. Continuing students must file the PROFILE and FAFSA forms by April 15, and submit the GW Financial Aid Application for Continuing Undergraduate Students and supporting tax documents to the Office of Student Financial Assistance no later than April 22. If funds are available, November 1 is the deadline for submission of all applications and supporting documents for the following spring semester. March 1 is the deadline for the summer sessions. Summer aid is limited to federal or alternative loans. A student must reapply each year for all need-based aid, including need based scholarships; renewal is contingent upon funds being available when the student completes the application.

University Scholarships

Full and partial tuition scholarships begin in the fall semester and may be renewed through the senior year, provided the holder reapplies by the published deadlines, maintains a *B* average or better, completes 15 credits per semester, and continues to demonstrate financial need.

Sherman Page Allen Memorial Scholarship Fund
American Association of Cost Engineers Scholarship
Mary J. Anderson Scholarship
Byron Andrews Scholarship
D.F. and J.D. Antonelli Scholarship Fund
Athletic Scholarship Fund
Atlantic Research Corporation Scholarship
Stanley M. Baer Scholarship in Electrical Engineering
Sigrid Weeks Benson Scholarship
Board of Trustees Scholarship
Gail E. Boggs Engineering Scholarship
Bou Family Foundation Scholarship
Henry N. Brawner, Jr., Foundation Scholarship Fund
A.D. Britt Scholarship Fund
Frederick Albert and Alma Hand Britten Scholarships
Barbara Willmarth Callahan Scholarship Fund
Mary Ellen Caplin Scholarship
Elsie M. Carper Undergraduate Scholarship Fund
Emma K. Carr Scholarships
Henry Harding Carter Scholarship
Maria M. Carter Scholarship
Paul E. Casassa Memorial Foundation Scholarship
James Edward Miller Chapman Educational Foundation Scholarship
Columbian Women Scholarship Funds
Victoria Briggs Scholarship Fund
Elizabeth V. Brown Scholarship Fund

Grace Ross Chamberlin Scholarship Fund
College Women's Scholarship Fund
Columbian Women Members' Scholarship Fund
Arline Hughes Dufour Scholarship Fund
Dr. Watson W. Eldridge, Jr., and John F. Eldridge Scholarship Fund
Founders of Columbian Women Scholarship Fund
Ross Lees Hardy Foundation Scholarship Fund
Lillian Young Herron Scholarship Fund
Nellie Maynard Knapp Scholarship Fund
Marcia B. Kraft Scholarship Fund
Janet McWilliams Scholarship Fund
Marie-Louise Ralph Turner Scholarship Fund
Cora and John H. Davis Scholarship
Isaac Davis Scholarship
Bertha B. Day Scholarship in Civil Engineering
District of Columbia Daughters of the American Revolution Scholarship
District of Columbia Institute of Certified Public Accountants Scholarship in Accounting
Estella Constance Drane Scholarship
Henry Parsons Erwin Scholarship
Robert Farnham Scholarship
Federal Government Accountants Association—Washington, D.C., Chapter—Scholarship in Accounting
Esther Brigham Fisher Scholarship
Dean James Harold Fox Scholarship
Geico Achievement Award
Louis E. Giles Memorial Scholarships
GW Tennis Alumni Association Scholarship
Gary C. and Leslie Granoff Scholarship Fund
Mildred Green Memorial Scholarship Fund
Gridiron Foundation of the Gridiron Club Scholarship
Isadore and Bertha Gudelsky Family Scholarship
Anna Spicker Hampel Scholarship
Theo Campbell Hartman Scholarship
Elma Lewis Harvey Scholarship
Hazelton Scholarship
George Hyman Construction Company Scholarships
Albert A. and Esther C. Jones Scholarship Fund
Allen M. Jones Scholarship Fund
David B. and James L. Karrick, Jr., Scholarship Fund
Samuel and Elizabeth Kay Scholarships
Amos Kendall Scholarship
L. Poe Leggette Memorial Scholarship Established by WRGW
Thaddeus A. and Mary Jean Lindner Scholarship Fund
Calvin D. Linton Endowment Scholarship Fund
Mary and Daniel Loughran Scholarship
Martha's Marathon Residence Hall Scholarship
Marshall Memorial Scholarship Fund
Maud E. McPherson Scholarship
Mensh Family Scholarship
A. Morehouse Scholarship
E. K. Morris Education Fund Scholarships
Lee Nowak Scholarship Fund
Helen Marie and Thomas E. Orr Scholarships
Henry and Caroline Orth Scholarship Fund
Thornton Owen Scholarship
Pan-Dodecanesian Association of America Scholarship

Hardy Pearce Scholarship Fund
James and Theodore Pedas Scholarship
Phi Delta Gamma Scholarships
Fred B. and Alma D. Pletcher Scholarship Fund
Levin M. Powell Scholarships
Jack B. Sacks Foundation, Inc., Scholarship
Henry Whitefield Samson Scholarship Fund
Scottish Rite of Freemasonry Scholarship Fund
Cecelia M. Sehrt Scholarship Fund
Sejong Scholarship Fund
Lula M. Shepard Scholarships
Mildred Shott Scholarship Fund
Sigma Delta Chi Foundation of Washington, D.C., Scholarships
Myrna Sislen Guitar Scholarship
Margaret Lucille Snoddy Scholarship
David Spencer Scholarship
George Steiner Scholarship in Music
Mary Lowell Stone Scholarship
Charles Clinton Swisher Scholarships
21st Century D.C. Scholars Program
U.S. Office of Education Traineeships
University Award for Phi Beta Kappa
University Players Scholarship in Memory of L. Poe Leggette
William Walker Scholarship
The Washington Post/Eastern High School Incentive Scholarship Program
Wanda Webb Memorial Scholarship
Abigail Ann Brown and Henry Kirk White Scholarship Fund
John Withington Scholarship
Women's Physical Education Alumnae Association Scholarship
William G. Woodford Scholarship
Ellen Woodhull Scholarship
Zonta Club Scholarship
Barbara Jackman Zuckert Scholarship Fund for Blind Part-Time Students

Other Academic Awards and Grants

Fannie Mae/H.D. Woodson High School Grant
George Washington University Tuition Grant
GW Partners in Academic Leadership Tuition Grants
GW Residence Hall Award
Marriott Foundation Grant

Activity Awards

Students who participate in cheerleading, debate, or the Pep Band will be considered for activity awards during the semesters they are actively involved. Additional information and eligibility requirements can be obtained from the directors of the programs.

Cheerleading Award
George F. Henigan Award in Debate
Pep Band Award

GW Family Tuition Grant

Families with two or more dependent children simultaneously enrolled as full-time undergraduates in a first-time degree program at The George Washington University can apply for the GW Family Grant for the younger sibling(s). This

is a half-tuition grant that can be awarded for the full academic year or for the fall or spring semester only and requires that all students being considered are charged the full tuition flat rate for their program. The grant is contingent on the recipient's maintaining a 2.0 grade-point average and reapplying by the deadline. Contact the Office of Student Financial Assistance for an application, which includes submission of a copy of the parents' federal tax return as verification of the dependent status of the students. International students must provide certification that they are dependent siblings either from their parents' employer (if an embassy or international organization such as the World Bank or International Monetary Fund) or from GW's International Services Office. The deadline is August 1 preceding the academic year; applications received after the deadline are awarded on a funds-available basis.

Resident Assistantships

Available to juniors and seniors in any field of study who are interested in working in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes salary and a furnished room for the academic year. All positions are part time, and staff members are required to enroll as full-time students in degree programs. Further information may be obtained from the Office of Residential Life.

Loan Funds

Federal Stafford Loans—George Washington University is an eligible participant in the Federal Stafford Loan Program. This is a variable interest rate loan currently capped at 8.25%; repayment is up to 10 years. Eligible students may apply for up to $2,625 as freshmen, $3,500 as sophomores, and $5,500 as juniors and seniors. For students who receive Subsidized Stafford funds as part of their need-based financial aid award, the government pays the interest while they are enrolled in school at least half-time and for six months afterward. Students not eligible, or only partly eligible, for subsidized funds may apply for an Unsubsidized Stafford Loan up to the same limits to cover their family contribution and any unmet need. Terms and conditions are the same, except that the student borrower is responsible for all interest that accrues on the unsubsidized loan from the date it is disbursed; deferments are available. Independent students (and students whose parents are denied a PLUS loan) are eligible to borrow additional Unsubsidized Stafford funds of $4,000 as freshmen and sophomores and $5,000 as juniors and seniors.

Federal Parent Loan for Undergraduate Students (PLUS)—George Washington University also participates in PLUS. This is a government-sponsored loan that can be used to supplement the student's Federal Stafford Loan or to meet with the family contribution. It is a credit-based, variable-rate loan currently capped at 9% for first-time borrowers. Each academic year, parents without adverse credit history may apply for a PLUS loan up to the cost of education minus financial aid, for each dependent child attending college at least half-time. Loan repayment begins within 60 days of the last disbursement and the maximum repayment term is 10 years.

Please note that Federal Stafford (Subsidized and Unsubsidized) and Federal PLUS loans are made by lenders, including banks, credit unions, and savings and loan associations. The loans are insured by a guaranty agency and reinsured by the federal government; origination and insurance fees are deducted from loan proceeds beforehand. Families who intend to use loan funds for payment of University charges at time of registration should submit a loan application and all supporting documents to the Office of Student Financial Assistance no later than May 1 for the fall semester, October 1 for the spring semester, or March 1 for summer sessions.

Note that federal statute requires multiple disbursements of Stafford and PLUS loans. Recipients of one-semester-only loans should be aware that the second disbursement of loan proceeds occurs halfway through the semester. Federal regulations require loan proration if the student's last loan period is less than a full academic year. Students may not borrow against or take out an emergency loan on their next semester's loan disbursement until the first day of classes of that term.

Other Loan Funds—The following loan funds are available to degree students. Complete information regarding each loan is available from the Office of Student Financial Assistance, Fiscal Section.

George F. Henigan Loan Fund
International Student Loan Fund
Joanne Jacobs Student Loan Fund
Jessie B. Martin Loan Fund
Jack and Anne Morton Loan Fund
Barney Plotnick, M.D., Student Loan Fund
Hiram Miller Stout Memorial Loan Fund
University Student Emergency Loan Fund
Edmund W. Dreyfuss Loan Fund
Peter and Doris Firsht Loan Fund

In addition, the Inner-City Special Student Assistance Loan Fund is available through the GW Multicultural Student Services Center.

Student Employment

The University participates in the Federal Work–Study Program. Inquiries should be addressed to the Office of Student Financial Assistance. Work–study job placement is handled by the Career Center. In addition, the Career Center maintains a registry of both full-time and part-time positions available in the Washington area for undergraduate and graduate students. After registration, students may apply at the Career Center for interviews and referrals to positions for which they are qualified.

International Students

Undergraduate international students with proven financial need who have completed one semester of full-time work (15 hours) at this University with a *B* average are eligible to apply for the Board of Trustees Scholarships; those with a *C* average are eligible to apply for GW Grants. Aid is awarded in the spring for the following academic year. See instructions for applying for undergraduate financial aid, above. For those not filing a U.S. tax return, a letter from the employer, certifying salary and benefits, is required.

Long-term loan funds for undergraduate and graduate international students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have sufficient funds available to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September–May) was $30,485 in 1997–1998 and will be higher in 1998–1999; generally speaking, expenses for international students are about $2,000 over the stated figure, which includes room and board, tuition, books, clothes, and incidental expenses, but not travel, holiday, or medical expenses.

Veterans Benefits

The Veterans Benefits office assists students entitled to educational benefits as active-duty personnel, veterans, or as widows or children of deceased or totally

disabled veterans with any problems that may arise concerning their benefits. This office also processes certification of enrollment and attendance to the Veterans Administration so that educational allowances will be paid.

When feasible, students entitled to benefits as active-duty personnel, veterans, or dependents of veterans should consult with the veterans counselor prior to submitting applications to the Veterans Administration. All such students should obtain the instruction sheet issued by the veterans counselor; it sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and includes other information of general interest. Eligible students should be aware they must be admitted to a degree seeking program by the start of their third semester in order to continue receiving veterans benefits.

PRIZES

The following academic prizes are supported by permanently endowed funds established through the Office of the Vice President and Treasurer. The many other prizes and awards available to GW students are funded annually, rather than by permanent endowment, and are listed in the annual commencement program when information is provided in time for publication.

Abdelfattah Abdalla Prize—Awarded annually to a junior or senior in the Department of Electrical Engineering and Computer Science for scholarship and service.

Norman B. Ames Memorial Prize—Awarded annually to a graduating senior in the School of Engineering and Applied Science who has made significant contributions to the School and the University.

Buka Family Prize—Provided by Ruth Buka in honor of her parents, Georg and Rosa Buka, and her sister, Hilde Buka-Lacour. It is awarded to the most outstanding student in German languages and literatures.

Byrne Thurtell Burns Memorial Prize—Awarded to the senior majoring in chemistry who shows the greatest proficiency in organic chemistry, as evidenced by a comprehensive examination, and who possesses such qualifications of mind and character as to give promise of future achievement.

Wilbur J. Carr Prize—Established in 1962 by Edith K. Carr, former Trustee of the University, in memory of her distinguished husband, who was graduated from the School of Comparative Jurisprudence and Diplomacy in 1899. It is awarded annually to that student in the graduating class of the University who has demonstrated outstanding ability in the study of international affairs and who has given evidence of possessing in marked degree the qualities that produce the good citizen and the dedicated public servant.

Astere E. Claeyssens Prize—Established in 1981 by the Trustees of the Bess and Arthur Dick Family Foundation. It is awarded for the best original work in playwriting by a student enrolled in the University.

John Henry Cowles Prizes—Two prizes, established by John H. Cowles, Grand Commander of the Supreme Council of Thirty-third Degree (Mother Council of the World) of the Ancient and Accepted Scottish Rite of Freemasonry, Southern Jurisdiction of the United States of America. Awarded upon graduation to the graduate or undergraduate student with the best overall scholastic achievement and leadership potential in the School of Business and Public Management and in the Elliott School of International Affairs.

DeWitt Clinton Croissant Prize—Awarded annually to the undergraduate student enrolled in a course in drama or active in University dramatics who submits to the English Department the best essay on drama or the theater.

E.K. Cutter Prize—Established by Marion Kendall Cutter "for excellence in the study of English." Awarded to the member of the graduating class whose record in English, combined with general excellence, shows the most marked aptitude for and attainment in English studies.

Isaac Davis Prizes—Established in 1847 and awarded annually to the three seniors who have made the greatest progress in public speaking while enrolled in the University. Awards are determined by a public-speaking contest in which the participants deliver original orations. Only members of the senior class of Columbian School who are candidates for the degree of Bachelor of Arts or Bachelor of Science are eligible to compete.

Elton Prize—Established by the Reverend Romeo Elton, of Exeter, England, and awarded annually to the student with the highest average in the most advanced course in the Greek language and literature.

Jesse Frederick Essary Prize in Journalism—Established by Helen Essary Murphy and awarded annually to a student who has given promise of sound citizenship and who submits the best printed and published evidence of ability in "forthright reporting" and good journalistic writing in a student publication or elsewhere.

Jessie Fant Evans Prize—A bequest of Joshua Evans, Jr., in 1971, in recognition of his wife's distinguished record at and service to the University, on whose Board of Trustees she served as the first woman member. Awarded annually to an outstanding senior student in a contemporary history course.

Joshua Evans III Prize in Political and Social Science—A memorial prize "established by friends because of an outstanding life." Awarded annually to that student in the graduating class "who has demonstrated his/her signal ability in the social and political sciences and who has given promise of the interpretation of that ability in good citizenship among his/her fellows."

Willie E. Fitch Prize—Established by James E. Fitch in memory of his son. Awarded annually to a senior student for the best examination in chemistry.

Alfred Martin Freudenthal Prize—Awarded annually to the senior in the School of Engineering and Applied Science who graduates with the highest scholastic standing.

Charles E. Gauss Prize—Established in honor of Charles E. Gauss, Elton Professor of Philosophy from 1945 to 1964. Awarded annually to a graduating senior for excellence in philosophy.

Alice Douglas Goddard Prize—A memorial established by Frederick Joseph Goddard, of Washington, D.C. Awarded annually to the senior student making the highest average in American literature.

Edward Carrington Goddard Prize—Established by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Washington, D.C., in memory of Edward Carrington Goddard, class of 1881. Awarded to the junior or senior student making the highest average in French language and literature.

Morgan Richardson Goddard Prize—A memorial established by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Washington, D.C. Awarded to the junior or senior student making the highest average in the following fields: business administration, economics, international business, or public accounting.

Harmon Choral Prize—Established in 1986 in memory of Dr. Robert H. Harmon, director of the Glee Club from 1924 to 1964, by his brother Bishop Nolan Harmon and the GW Department of Music. Awarded annually to one or two students who have made outstanding contributions to the choral programs.

Ching-Yao Hsieh Prize—Two prizes awarded annually, one to an undergraduate and one to a graduate student in the Department of Economics.

Gardiner G. Hubbard Memorial Prize in United States History—Established by Gertrude M. Hubbard in memory of her husband and awarded annually to that member of the graduating class majoring in history who has maintained the highest standing in courses in United States history.

Cecille R. Hunt Prize—Offered annually to deserving art students and every two or three years to participants in the University's Art Alumni Exhibition.

David Lloyd Kreeger Prizes in Art—Eight prizes given by Mr. Kreeger, six in the fine arts and two in art history (including museology). Fine arts prizes are awarded to a senior or graduate student in painting, sculpture, printmaking, ceramics, photography, and visual communication. One prize in art history is awarded to a senior and one to a graduate student. Candidates for the prizes must submit original papers or works of art. Winners are selected by distinguished representatives of the field of art in the Washington, D.C., area.

Minna Mirin Kullback Memorial Prize—Established in 1968 by Solomon Kullback in memory of his wife. Awarded annually by a committee of faculty members of the Department of Statistics to a full-time undergraduate or graduate student majoring in statistics, who will have completed 18 credit hours of statistics courses by the end of the spring semester.

John Francis Latimer Prize in Classics—Established in 1973. Awarded to a graduating senior who has made the most outstanding record as a major in the Department of Classics.

Martin Mahler Prize in Materials Testing—Awarded to the upper-division graduate student in engineering who submits the best reports on tests in the materials laboratory course, with preference given to prestressed concrete tests.

Hilda Haves Manchester Prize in Sociology—Established in honor of Hilda Haves Manchester, B.A. 1932, an outstanding student whose major field was sociology. Awarded annually by Columbian School to the senior student majoring in sociology who has the highest scholastic record.

The Barry Manilow Endowed Prize in Music—Established in 1983. Awarded annually to a student majoring in music. The award is made on the basis of academic performance and musical ability, as determined by a committee of faculty appointed by the chair of the Music Department.

Vivian Nellis Memorial Prize—Awarded to a student in the English Department who has shown special promise in the field of creative writing.

Ruggles Prize—Established by Professor William Ruggles in 1859. Awarded annually to a candidate for a bachelor's degree for excellence in mathematics.

Howard C. Sacks Prize—Awarded to a student in political science who has demonstrated outstanding academic achievement in the study of Far Eastern affairs.

Hermann and Johanna Richter Schoenfeld Prize—Established in grateful appreciation of the inspired teaching and devotion to his students of Dr. Hermann Schoenfeld, who for more than 20 years until his death in 1926 headed the Department of German. Hermann Schoenfeld, Ph.D., LL.D., was widely recognized as a scholar of distinction whose presence on the faculty added prestige to the University. This prize is given annually to a member of the graduating class for excellence in historical and cultural phases of German studies.

Julian H. Singman Prizes—Two prizes awarded annually, one in design and one in aquarelle painting.

Sylvia S. Speck Prize—Awarded to a graduating senior for exemplary academic achievement in English literature.

Staughton Prize—Established by the Reverend Romeo Elton and awarded annually to the student making the best record in the most advanced course in Latin language and literature.

Alfred E. Steck Memorial Prize—Awarded for proven excellence in the field of sculpture.

James MacBride Sterrett, Jr., Prize—Established in 1911 by Professor Sterrett in memory of his son. Awarded annually to the student who obtains the highest average in Physics 1 and 2.

Charles Clinton Swisher Historical Club Prize—Established in 1936 by the Charles Clinton Swisher Historical Club and augmented in 1941 by the bequest of Professor Swisher. Awarded annually to the student who submits the best essay covering some phase of medieval history.

Thomas F. Walsh Prize—Established in 1901 and awarded annually to the student who submits the best essay in Irish history.

Alexander Wilbourne Weddell Prize—Established in 1923 by Virginia Chase Weddell in memory of her husband. Awarded annually to a degree candidate who writes the best essay on "the promotion of peace among the nations of the world." The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

UNIVERSITY REGULATIONS

Students enrolled in the University are required to conform to the following regulations and to comply with the rules and regulations of the school or division in which they are registered. Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reenter and continue work only under the regulations and requirements in force at the time of return.

If a student knowingly makes a false statement or conceals material information on an application for admission or any other University document, the student's registration may be canceled. If such falsification is discovered after the student has matriculated at the University, the student may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the faculty) for subsequent registration in the University.

Registration

Information on registration procedures is stated in the *Schedule of Classes*, which is available in advance of each semester.

Registration in courses is open only to those persons formally admitted to the University by the appropriate admitting office, as well as those students in good standing who are continuing in an approved program of study.

No registration is accepted for less than a semester or one summer session.

Students may not register concurrently in this University and another institution without the prior permission of the dean of the school in which they are registered in this University. With the exception of students enrolled in joint degree program, registration in more than one school of the University requires the written permission of the deans concerned, prior to registration. Registration is not complete until all financial obligations have been met.

Eligibility for Registration

Registration for the following categories of campus students is held on the days of registration published in the *Schedule of Classes*. A student who is suspended or whose record is not clear for any reason is not eligible to register. Registration in a given course may be denied students in the Division of University Programs when space is needed for degree candidates.

New Student—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration.

Readmitted Student—A student previously registered in the University who was not registered during the preceding semester must apply for and be granted readmission by the appropriate admitting office before being eligible for registration.

Continuing Student—A student registered on campus in the immediately preceding semester or the summer session preceding the fall semester is eligible to register assuming good standing and enrollment in a continuing program.

Completion of Registration

Registration is not complete until financial obligations have been fulfilled. Students who do not complete their financial obligations in a timely manner may be deregistered and will not be permitted to attend class.

Registration for Consortium Courses

Degree students interested in taking courses at any of the other institutions in the Consortium of Universities of the Washington Metropolitan Area, Inc., should consult the program announcements of the other institutions. Consortium registration forms and instructions may be picked up in the Office of the Registrar. In order to participate in the Consortium program, students must obtain the approval of an advisor and should ascertain from the department of the institution where the course is taught whether they are eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar. Detailed information concerning Consortium policy and procedures is printed in the *Schedule of Classes*.

Student Status

For the purpose of defining student status, undergraduates taking 12 or more credit hours are considered to be full time, those taking 6 to 11 hours are considered to be half time, and all others are considered to be part time.

Attendance

Students may attend only those classes for which they are officially registered. Regular attendance is expected. Students may be dropped from any course for undue absence.

Scholarship Requirements

Students who fail to maintain the scholarship requirements of the school or division in which they are registered may be dismissed from the University.

Grades

Grades are mailed to students through the Office of the Registrar at the close of each semester. The following grading system is used: *A*, Excellent; *B*, Good; *C*, Satisfactory; *D*, Low Pass; *F*, Fail; *I*, Incomplete; *IPG*, In Progress; *W*, Authorized Withdrawal; *Z*, Unauthorized Withdrawal; *P*, Pass; *NP*, No Pass. Other grades that may be assigned are *A*−, *B*+, *B*−, *C*+, *C*−, *D*+, and *D*−. Except for courses that specifically state that repetition for credit is permitted, a candidate for a degree at this University may not repeat a course in which a grade of *D* or better was received, unless required to do so by the department concerned. A written statement, indicating that the student is required to repeat the course, must be submitted to the student's dean by the appropriate department chair.

Incomplete/Authorized Withdrawal

When another grade has not been assigned, the symbol *I* (Incomplete), the symbol *W* (Authorized Withdrawal), or the symbol *Z* (Unauthorized Withdrawal

will be recorded. The symbol *I* indicates that a satisfactory explanation has been given the instructor for the student's inability to complete the required work of the course. At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond the student's control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, that instructor may initiate an appropriate grade change. The grade of *Z* is assigned when students are registered for a course that they have not attended and in which they have done no substantial graded work.

Changing a Grade of Incomplete

When work for the course is completed and a grade change turned in to the Office of the Registrar, the grade earned will be indicated in the form of *I*, followed by the grade. The indication of *I* cannot be removed from the transcript. For more information concerning changing a grade of Incomplete, consult the regulations of the school or division concerned.

The Grade-Point Average

Scholarship is computed in terms of the grade-point average, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on his or her record in this University. The grade-point average is computed as follows: *A*, 4.0; *A*−, 3.7; *B*+, 3.3; *B*, 3.0; *B*−, 2.7; *C*+, 2.3; *C*, 2.0; *C*−, 1.7; *D*+, 1.3; *D*, 1.0; *D*−, .7; *F*, 0, for each credit hour for which the student has registered in a degree program. Although credit value for a course in which a grade of *F* is earned appears on the transcript for the purpose of calculating the grade-point average, no academic credit is awarded. Courses marked *CR*, *I*, *IPG*, *P*, *NP*, *W*, or *Z* are not considered in determining the average, except that courses marked *I* will be considered when a final grade is recorded. With the exception of Consortium courses, grades in courses taken at other institutions are not considered in computing the grade-point average.

Final Examinations

Final examinations for undergraduate courses are scheduled by the Office of the Registrar.

Use of Correct English

A report regarding any student whose written or spoken English in any course is unsatisfactory may be sent by the instructor to the dean of the school, who may assign supplementary work, without academic credit, varying with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the dean.

Academic Integrity

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels.

Copies of the University Code of Academic Integrity can be obtained from the following officers: all department chairs, all academic deans, the Registrar, and the Vice President for Academic Affairs.

Student Conduct

All students, upon enrolling and while attending The George Washington University, are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained from the Office of the Dean of Students or from the offices of the academic deans. Sanctions for violation of these regulations may include permanent expulsion from the University, which may make enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

Withdrawal

Withdrawal from a course or from the University requires the permission of the dean of the school or division in which the student is registered. A grade of W will be recorded on the student's academic record. Each school and division in the University sets deadline dates for each semester concerning withdrawal.

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations. Unauthorized withdrawal will result in the recording of a grade of Z for the course or courses.

Changes in Program of Study

Changes Within a School or Division—A student may not substitute one course for another or change status from credit to audit or from audit to credit without the approval of the dean of the school or division in which he or she is registered. Change from one major field to another within the same college or school may be made with the approval of the dean.

Transfer Within the University—Application for transfer to another school or division must be made to the appropriate admitting office on the form provided by the office concerned. Students transferring within the University are advised to study carefully the requirements listed below under Graduation Requirements and to note that unless otherwise specified, in all undergraduate divisions, 30 credit hours, including at least 12 credit hours in the major field, must be completed while registered in the school from which the degree is sought. Upon transfer the student should consult the dean concerned and understand clearly the requirements that must be fulfilled. A maximum of 45 credit hours earned in the Division of University Programs may be applied toward a bachelor's degree in the degree-granting schools of the University.

Credit

Credit is given only after completion of registration in a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the school or division concerned.

Auditing

A person who has been admitted to the University may be registered, with the permission of the instructor, as an auditor in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. Tuition is charged at the prevailing rate.

Post-Admission Transfer Credit

Students who plan to attend another institution and apply credit so earned toward graduation from this University must first secure the written approval of their dean. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

Transcripts of Record

Official transcripts of student records are issued on written request of the student or former student who has paid all charges, including any student loan installments, due the University at the time of the request. A nominal fee is charged for each official transcript. Unofficial copies of transcripts are mailed to students, by written request, at a nominal fee. Partial transcripts are not issued.

Continuous Enrollment Status

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. A student is considered to be continuously enrolled when registered for courses or when engaged in and appropriately registered for activities such as the following, as specified by the regulations established by each school: cooperative work semester; study abroad program; attendance at another institution with prior approval to have work transferred back to the GW program; completion of outstanding work in courses in which a grade of Incomplete or In Progress was received (at the undergraduate level); or non-course instructional activities unique to the particular school. This status is generally limited to one year. Should the student break continuous enrollment at the University and not request and be granted a leave of absence (see below), he or she must apply for readmission and, if granted, be subject to the requirements and regulations then in force.

Leave of Absence

Should a degree student find it necessary to interrupt active pursuit of the degree, he or she may petition the dean for a leave of absence for a specific period of time, generally limited to one calendar year. A degree student who discontinues active enrollment in degree studies without being granted a leave of absence, or a student granted a leave who does not return to active study at the close of the period of approved absence, must apply for readmission and be subject to the regulations and requirements then in force. The right to use of University facilities is suspended while the leave is in effect.

Name of Record

A student's name of record includes the first name, middle initial or full middle name, and the family name. Nicknames may not be used. The University will change the name of a currently enrolled student on its official records but will require satisfactory evidence of a legal basis for the change. The diploma is awarded under the official name of record at the time of graduation.

Graduation Requirements

Degrees are conferred in January, May, and September. To be recommended by the faculty for graduation a student must have met the admission requirements of the school in which registered, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree as stated in this bulletin, filed an application for graduation by the published deadline date, and be free from all indebtedness to the University. Enrollment is required for the semester or summer session at the close of which the degree is to be conferred, and all degree requirements must be completed by the last day of final examinations for that semester or summer session.

Participation in the Commencement Ceremony—Participation in the annual commencement ceremony held in May is open to students who have applied to graduate in the current spring semester or who graduated the preceding fall semester or summer session. Students who are within 6 hours of completing their degree requirements and who will complete all requirements during the summer session have the option of participating in either the preceding or the following May ceremony. Summer graduates who elect to attend the preceding May ceremony must apply for graduation no later than February 1. Students who apply after the published deadlines are not guaranteed commencement materials and may not be listed in the commencement program.

Honors

Bachelor's degrees with honors are awarded to students whose academic records give evidence of particular merit. The student's grade-point average determines the level of honors as follows: *cum laude*, 3.4–3.59; *magna cum laude*, 3.6–3.79; *summa cum laude*, 3.8–4.0. The grade-point average includes all course work completed at GW. To be eligible for an honors designation, a student must complete at least 60 hours of course work at GW.

The grade-point average is calculated by the Office of the Registrar, and the honors designation is entered on the transcript and diploma of those students who earn an honors designation. If Latin honors are entered in the commencement program, honors status will be determined on the basis of work completed by the end of the seventh term and entered only for those students who have completed seven-eighths of the credit hours required for the degree. Latin honors indicated on the diploma are calculated on the basis of all course work completed. The diploma and transcript are the official indication that a degree was conferred and Latin honors awarded.

Special Honors

Special Honors may be awarded by the faculty to any member of the graduating class for outstanding achievement in the student's major field on recommendation of the major department. The student must fulfill all of the following requirements: (1) Candidacy for Special Honors must be approved by the faculty member representing the major department or field not later than the beginning of the senior year. (2) Such other conditions as may be set at the time the candidacy is approved must be met. (3) At least one-half of the courses required for the degree must have been completed at GW. (4) The specific requirements of the school in which the student is registered must be fulfilled as follows: the Columbian School of Arts and Sciences or the Elliott School of International Affairs—grades of *A* or *B* in 50 percent of the courses taken at GW; (b) the School of Engineering and Applied Science or the School of Business and Public Management—a grade-point average of at least 3.0 on all course work taken at GW. Special honors awards appear on the transcript.

The Library

All students registered in the University have the privilege of using the University's Gelman Library. Its stacks are open, and all students are welcome to browse. Authorized GW identification is needed to enter the library and to borrow books.

Any book that circulates is subject to recall by the library if needed for reserve or requested by another user after a minimum of 20 days. Reserve books must be used in the library, except that they may be withdrawn for overnight use two hours before closing time. Transcripts of grades are withheld until a student's library record is clear, with all borrowed books returned and any fines paid.

All students using the University's Gelman Library are expected to be familiar with its detailed regulations, available at any of the library's service desks.

Right to Dismiss Students

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

Right to Change Rules

The University reserves the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

Right to Make Changes in Programs

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

University Policy on the Release of Student Information

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive students' written consent before releasing information from their education records to persons outside the University, except as provided by the Act and except for directory information as indicated below (information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency); and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of emergency contact; dates of attendance; school or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height, weight, and age of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information is published in the *Guide to Student Rights and Responsibilities*, available in the Office of the Dean of Students.

Property Responsibility

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the University Police Office.

University Policy on Drugs

The University cannot condone violations of law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

FEES AND FINANCIAL REGULATIONS

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution makes up the difference.

The following fees and financial regulations were adopted for the academic year 1998–99. Information on tuition and fees for the summer is published in the Summer Sessions Announcement.

Tuition Fees

For undergraduate study* in Columbian School of Arts and Sciences, the School of Business and Public Management, the School of Engineering and Applied Science, and the Elliott School of International Affairs. Full-time continuing undergraduates will be charged $21,320 for academic year 1998–99; full-time entering undergraduates will be charged $21,590. Part-time and non-degree students will be charged $680 per credit hour. Students admitted to the Seven-Year Integrated B.A./M.D. program pay a fixed net tuition rate annually; the amount is announced in the letter of admission.

University Fee (charged all students registered on campus)—$34.50 per credit hour, to a maximum of $517.50 per semester.

Additional Course Fees—Some courses carry additional fees, such as laboratory or material fees, charged by semester as indicated in course descriptions.

Residence Hall and Food Service Fees (see page 262)

Special Fees and Deposits (Nonrefundable)

Application fee (all degree candidates)	$55
Advance tuition deposit, charged each entering or readmitted full-time undergraduate	200
Orientation fee, charged each entering full-time undergraduate	150
Housing deposit, charged each applicant for residence hall space	300
Late registration beginning the first week of the semester	80
Registration for continuous enrollment or leave of absence	35
Graduation fee	100
Late-payment fee (see Payment of Fees, below)	75
Returned check fee, charged a student whose check is improperly drafted, incomplete, or returned by the bank for any reason	25
Special Columbian School departmental examination to qualify for receiving credit (advanced standing), waiver of requirement, or both	100
Waiver examination to qualify for advanced placement	25
Engineers' Council fee (charged all SEAS students), per semester	8
English test for international students (when required)	15
Study abroad fee	100
Laboratory check-out fee, for failure to check out of chemistry laboratory by the deadline date set by the instructor (a student who drops a chemistry course before the end of the semester must check out of the laboratory at the next laboratory period)	10

*A full-time program is defined as 12–17 credit hours per semester; a part-time program is fewer than 12 credit hours per semester. Undergraduates taking more than 17 credit hours per semester will be charged at the rate of 1 credit hour ($680) for each credit exceeding that limit. Undergraduates in the School of Engineering and Applied Science who are required to take 18 or 19 credit hours in some semesters will not be charged for the eighteenth and nineteenth credit hour.

Transcript fee	5
Replacement of lost or stolen picture identification card	25
Replacement of diploma	50

Payment of Fees

A student who registers for classes in any semester or session incurs a financial obligation to the University. Payment of tuition and fees, as detailed on the Schedule and Invoice, is due approximately two weeks prior to the first day of classes. Changes to registration that affect charges to the student's account must be recorded through the Office of the Registrar. In addition to payment of tuition and fees, the University requires that a student confirm his or her registration. Students whose registrations are not confirmed by the third week of the semester may be canceled from all courses. Receipt of the tear-off portion of the Schedule and Invoice, typically mailed with the student's payment, is requested for confirmation of registration. All students whose registrations are not confirmed are notified in writing that their registrations will be canceled and are asked to contact the Student Accounts Office immediately.

Charges for residence halls and meal plans are in accordance with lease agreements signed by the student. Questions concerning those charges should be referred to the Community Living and Learning Center.

The University offers several options for payment of tuition and fees in addition to payment in full upon receipt of the Schedule and Invoice or at the time of registration.

Deferred Payment Plan—Any student registered for 6 or more credit hours may be eligible to participate in this plan. Advance arrangements are not required. Students who receive GW employee tuition benefits or departmental tuition awards are not eligible to participate in this plan unless the student's balance after awards are deducted is greater than $3,000. An eligible student may use the deferred payment plan by paying the minimum amount due for the semester as specified. The remaining balance plus accrued interest is due by the eighth week of classes. Interest on unpaid balances is charged at the rate of 1.5% per annum beginning the first day of classes each semester. If payment in full is not received by the end of the eighth week of the semester, interest will continue to accrue at the rate previously stated and the account will be assessed a $50 late payment fee.

Monthly Payment Plan—The University's payment plan is open to all students and is available for the fall and spring semesters only. Students must complete and submit an application by August 15 for the academic year or by January 1 for the spring semester to participate in the plan. Upon approval of the application, the University will furnish coupons and return address labels for each payment. The monthly payment plan for the academic year begins in June and ends in March, with the first five payments applied to the fall account and the second five applied to spring. For spring semester only, the plan begins in November and ends in March. Under the plan, all payments are due on the first of each month. The student will receive a monthly bill, but no interest or late fee will be charged provided payments are received as scheduled. Students who enroll in the plan after the first month must make up all payments to the month of enrollment. Interest and a $50 late payment fee are assessed all accounts not paid in full by October 1 for fall and March 1 for spring.

Third-Party Billing—The University accepts employer vouchers or purchase orders that are not contingent upon receipt of grades. Under all circumstances, however, the charges for tuition and fees remain the responsibility of the student. Should a sponsor fail to remit payment to the University, the University will contact the student for payment. A student whose employer or sponsor reimburses him or her for tuition and fees after receipt of grades must pay all charges by the stated due date to avoid interest, late fees, and/or cancellation of re-

tration. Students whose tuition is paid in full or part by employee benefits or teacher tuition remission must pay any remaining balance by the stated due date to avoid interest, late fees, and/or cancellation of registration.

Accounts that are past due are encumbered by the University. A student whose account is encumbered may not register for future semesters and may not receive diplomas or transcripts. Accounts that are more than 90 days past due are referred to an agency for collection. The student is then responsible for all charges due the University as well as all collection costs incurred by the agency.

A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee.

Withdrawals and Refunds

Applications for withdrawal from the University or from a course after the registration period must be made in writing to the dean of the school or division and to the registrar. Notification to an instructor is not an acceptable notice (see Withdrawal under University Regulations). Financial aid recipients must notify the Office of Student Financial Assistance in writing. No refund of the tuition deposit required of entering students is granted.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. ***Complete withdrawal from all courses (on-campus students):***
   Withdrawal dated on or before the end of the first week of the semester 80%
   Withdrawal dated on or before the end of the second week of the semester . . . 60%
   Withdrawal dated on or before the end of the third week of the semester 40%
   Withdrawal dated on or before the end of the fourth week of the semester . . . 25%
   Withdrawal dated after the fourth week of the semester . . . . . None
2. ***Partial withdrawal:*** If the change in program results in a lower tuition charge, the refund schedule above applies to the difference.
3. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.
4. *Summer Sessions.* In cases of authorized withdrawals from courses, refunds of 75% of tuition and fees will be made for courses dropped within the first seven calendar days of the start of a session. No refund will be made for courses dropped thereafter.

The above information regarding cancellation of tuition charges and fees after withdrawal from the University may not apply to entering students who are recipients of federal aid; those students should check with the Student Accounts Office for the applicable cancellation schedule.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education. Federal regulations require that financial aid recipients use such refunds to repay financial aid received for that semester's attendance. This policy applies to institutional aid as well.

In no case will tuition be reduced or refunded because of absence from classes. Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

INDEX

Abbreviations, key to, 61
Academic integrity, 279
Academic work load for employed students, *see* school concerned
Accountancy, 62; *see also* School of Business and Public Management
Accreditation, 9
Administration, officers of, 13
Admissions, 253; *see also* school concerned
Advanced standing, 255; *see also* school concerned
Africana studies, 63
Alumni association, 11
American studies, 64
Anthropology, 66
Applied science, 70
Arabic, *see* Classics, 90
Archaeology, *see* Anthropology, 66
Art, 71
Astronomy, *see* Physics, 164
Athletics, 267
Auditing, 281
Awards (Prizes), 274
Biological sciences, 78
Board of trustees, 11
Business administration, 82; *see also* School of Business and Public Management
Business and Public Management, School of, 29
Calendar, 5
Career center, 262
Changes in program of study, 280
Chemistry, 84
Chinese, *see* East Asian languages and literatures, 96
Civil, mechanical, and environmental engineering, 86; *see also* School of Engineering and Applied Science
Classical humanities, *see* Classics, 90
Classics, 90
Clinical laboratory science, *see* School of Medicine and Health Sciences Bulletin
Columbian School of Arts and Sciences, 16
Communication, 93
Computer information and resource center, 263
Computer science, *see* Electrical engineering and computer science, 103; *see also* Mathematics, Management science, Statistics, School of Business and Public Management, School of Engineering and Applied Science
Conduct, regulations concerning, 280
Consortium of universities, 10
Continuous enrollment, 281
Counseling (courses), 95
Counseling center, 263
Course numbers, explanation of, 60
Courses of instruction, 60
Credit, 280
  By examination, 256
  Earned through USAFI, DANTES, 257
  Explanation of amount of, 60
  For service school courses, 256
  Post-admission transfer, 281
  Transfer, from other institutions, 254; *see also* school concerned
  Transfer, within the university, 280; *see also* school concerned
Criminal justice, *see* Sociology, 183
Dance, *see* Theatre and dance, 193
Dean of students, office of, 262
Dean's honor list, *see* school concerned
Disability support services, 264
Dismissal of students, 283
Division of University Programs, 257
Drama, *see* Theatre and dance, 193
Dramatic literature, 95
Early admission plan, 253
Early modern European studies, 96
East Asian languages and literatures, 96
East Asian studies, 99
Economics, 99
Education and Human Development, Graduate School of, *see* Graduate Programs Bulletin
Educational leadership, 103
Electrical engineering and computer science, 103; *see also* School of Engineering and Applied Science
Electronic media, *see* Media and public affairs, 148
Elliott School of International Affairs, 34
Emergency medical services, *see* School of Medicine and Health Sciences Bulletin
Employment, student, 264, 273
Engineering and Applied Science, School of, 41
Engineering management, 111
Engineering science, *see* Civil, mechanical, and environmental engineering, 86
English, 111
English as a foreign language, 117
Environmental studies, 118
Equal opportunity, university policy on
Examinations:
  American College Testing Program, 253
  College Board Advanced Placement Tests, 255

College-Level Examination Program, 256
Scholastic Assessment Tests, 253
English as a foreign language, test of (TOEFL), 254
Waiver (Columbian School special departmental), 21
Faculty and staff of instruction, 202
Fees and financial regulations, 285
Residence halls and food service, 262
Finance, 120; *see also* School of Business and Public Management
Financial aid, 267
Financial regulations, 285
Fine arts, *see* Art, 71
Food service, 262
Forensic sciences, 120
French, *see* Romance languages and literatures, 177
Geography, 121
Geology, 123
German and Slavic languages and literatures, 125
Grades, 278; *see also* school concerned
Graduation, 282; *see* Calendar for date
Grants, *see* Financial aid, 267
Greek, *see* Classics, 90
Health and accident insurance, 263
Health sciences, 128
Heath service, student, 262
Hebrew, *see* Classics, 90
History, 129
Honor societies, 258
Honors:
Latin honors, 282
Special honors, *see* department concerned
University honors program, 134, 258
Human services, *see* Sociology, 183
Humanities, 136
Incomplete/authorized withdrawal, 278
Incomplete, removal of, *see* school concerned
Insurance, health and accident, 263
International Affairs, Elliott School of, 54
International affairs (courses), 137
International business, 139; *see also* School of Business and Public Management
International services, 264
International students:
Admission, 254
Financial aid, 273
Italian, *see* Romance languages and literatures, 177
Japanese, *see* East Asian languages and literatures, 96
Joint degree programs, 259
Journalism, *see* Media and public affairs, 148
Judaic studies, 140
Korean, *see* East Asian languages and literatures, 96
Latin, *see* Classics, 90
Latin American studies, 141
Law School, *see* Law School Bulletin
Leave of absence, 281
Legal assistant program, *see* Sociology, 183
Liberal arts, program in, 141
Libraries, 10, 283
Linguistics, 142
Loans, 272
Management science, 142
Marketing, 143
Mathematics, 144
Mechanical engineering, *see* Civil, mechanical, and environmental engineering, 86; *see also* School of Engineering and Applied Science
Media and public affairs, 148
Medicine and Health Sciences, School of, 59; *see also* School of Medicine and Health Sciences Bulletin
Middle Eastern studies, 153
Multicultural student services center, 264
Music, 154
Naval science, 158
NROTC, 158
Nondegree status, 257, 259
Office of university students, 259
Officers of administration, 13
Operations research, 160; *see also* School of Engineering and Applied Science
Pass/no pass option, *see* school concerned:
CSAS, 28
SBPM, 35
SEAS, 45
ESIA, 57
Peace studies, 161
Philosophy, 161
Physical science, *see* Chemistry, 84
Physics, 164
Placement examinations, 255; *see also* department concerned
Political communication, *see* Media and public affairs, 148
Political science, 167
Post-admission transfer credit, 280
Preparation for medical school (arts and sciences), 28; *see also* School of Engineering and Applied Science
Prizes, 274
Probation, *see* school concerned
Psychology, 171
Public administration, 174
Public Health and Health Services, School of, 59
Radiologic sciences, *see* School of Medicine and Health Sciences Bulletin
Readmission, 255
Refunds, 287
Registration, 277

Regulations, University, 277; *see also* Fees and financial regulations, and school concerned
Release of student information, University policy on, 283
Religion, 174
Religious life, 266
Residence halls, 262
Residence requirements, *see* school concerned:
CSAS, 17
SBPM, 35
SEAS, 42
ESIA, 56
Residential life, 262
Romance languages and literatures, 177
ROTC, 259
Rules of the University, right to change, 283
Russian, *see* German and Slavic languages and literatures, 125
Scholarship requirements, 278; *see also* school concerned
Scholarships, *see* Financial aid, 267
Secondary fields of study, 258
Senate, Faculty, 15
Service–learning program, 183
Columbian School regulations, 28
700 series, 183
Slavic, *see* German and Slavic languages and literatures, 125
Sociology, 183
Spanish and Spanish-American literature, *see* Romance languages and literatures, 177
Special education, *see* Teacher preparation and special education, 192
Special honors, 282, *see also* department concerned
Special programs, 258
Speech and hearing, 188
Speech and hearing center, 263
Statistics, 189
Strategic management and public policy, 192
Student employment, 264, 273
Student health service, 262
Student services, 262
Student organizations, 265
Study abroad, 258
Summer sessions, 261; *see also* Summer Sessions Announcement
Suspension, *see* school concerned
Systems analysis and engineering, *see* School of Engineering and Applied Science
Teacher preparation and special education, 192
Television, GW, 11
Theatre and dance, 193
Tourism and hospitality management, 196; *see also* School of Business and Public Management
Transcripts of record, 281
Transfer students, admission, 254
Transfer within the University, 280
Tuition, 285
Advance deposit, 255
University Professors' courses, 197
University regulations, 277
Veterans benefits, 273
Vietnamese, *see* East Asian languages and literatures, 96
Withdrawal, 278, 280, 287; *see also* school concerned
Women's studies, 200
Writing center, 263
Yiddish, *see* Classics, 90

DEGREES OFFERED BY THE GEORGE WASHINGTON UNIVERSITY

Columbian School of Arts and Sciences: Bachelor of Arts (B.A.), Bachelor of Music (B.Mus.), Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.F.S.), Master of Science (M.S.), Master of Science in Forensic Science (M.S.F.S.), Master of Philosophy (M.Phil.), Doctor of Philosophy (Ph.D.), and Doctor of Psychology (Psy.D.)

School of Medicine and Health Sciences: Bachelor of Science in Health Sciences (B.S.H.S.), Master of Science in Health Sciences (M.S.H.S.), and Doctor of Medicine (M.D.)

Law School: Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

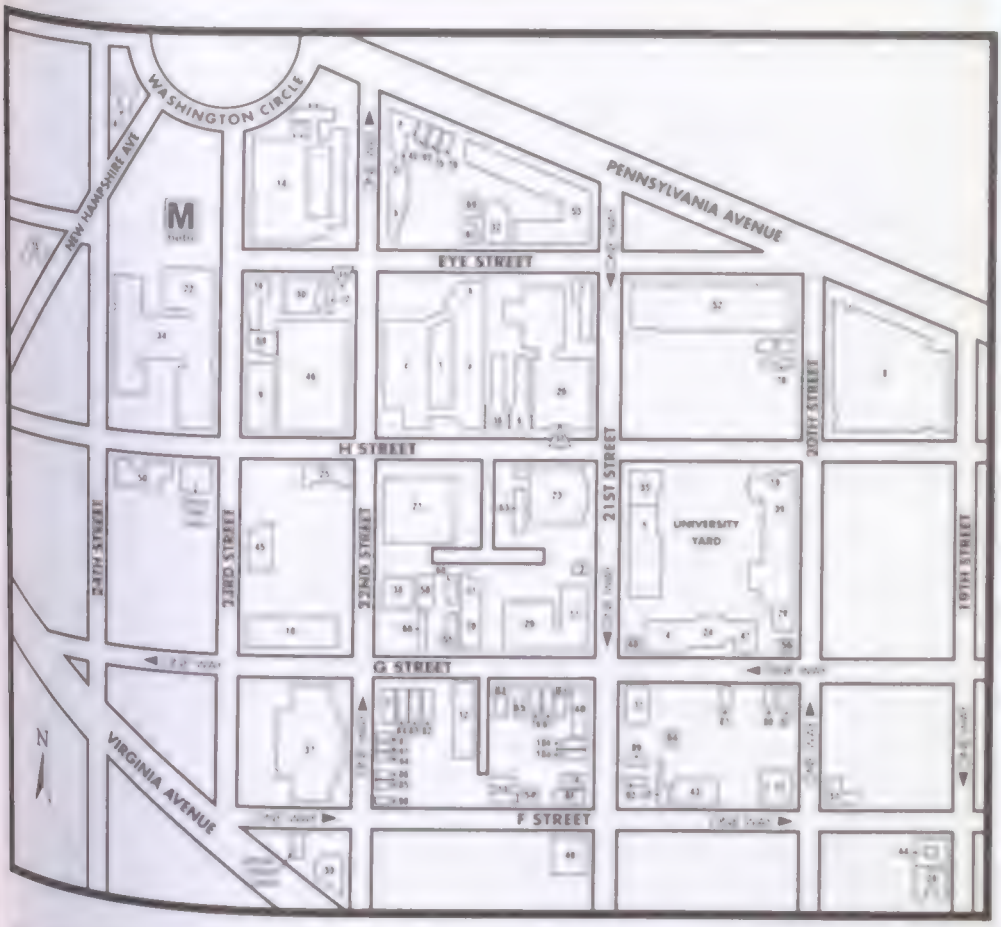
School of Engineering and Applied Science: Bachelor of Science (Civil Engineering) (B.S.[C.E.]), Bachelor of Science (Computer Engineering) (B.S.[C.Eng.]), Bachelor of Science (Computer Science) (B.S.[C.S.]), Bachelor of Science (Electrical Engineering) (B.S.[E.E.]), Bachelor of Science (Mechanical Engineering) (B.S.[M.E.]), Bachelor of Science (Systems Analysis and Engineering) (B.S.[S.A.&E.]), Master of Engineering Management (M.E.M.), Master of Science (M.S.), Engineer (Engr.), Applied Scientist (App.Sc.), and Doctor of Science (D.Sc.)

Graduate School of Education and Human Development: Master of Arts in Education and Human Development (M.A. in Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

School of Business and Public Management: Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Finance (M.S.F.), Master of Science in Information Systems Technology (M.S.I.S.T.), Master of Science in Professional Accounting (M.S.P.A.), Master of Science in Project Management (M.S.P.M.), Master of Taxation (M.Tax.), Master of Tourism Administration (M.T.A.), and Doctor of Philosophy (Ph.D.)

Elliott School of International Affairs: Bachelor of Arts (B.A.), Master of Arts (M.A.), and Master of International Policy and Practice (M.I.P.P.)

School of Public Health and Health Services: Bachelor of Science (B.S.), Master of Science (M.S.), Master of Public Health (M.P.H.), Master of Health Services Administration (M.H.S.A.), Specialist in Health Services Administration (Spec.H.S.A.), and Doctor of Public Health (Dr.P.H.)



Academic Center
a.
b.
c.
Adams Hall
Alumni House
Bell Hall
Corcoran Hall
Crawford Hall
Davis-Hodgkins House
Editor Bldg.
Evermden Hall
Funger Hall
Government Hall of
(GEMG
Gothridge Hall
Hospital (University
Inn at Foggy Bottom
The George Washington University
Kennedy Shaaeni Hall 2222 Eye St.
Key Hall 600 20th St.
Lindfield Hospital
a. 500 21st St.
b.
Lisner Hall 2000

LIBRARIES
Aaron Burr
Gelman
Paul Himmelfarb Health Sciences

11 Lisner Auditorium 730 21st St
12 Lisner Hall 2023 G St
25 Madison Hall 736 22nd St
* Marvin Center 800 21st St
Medical Faculty Associates
a.
b.
Mitchell Hall 514 19th St
Monroe Hall 2115 G St
Munson Hall 2212 Eye St
Quigley's 619 21st St
Rice Hall 2121 Eye St
Riverside Towers Hall
Rome Hall
Samson Hall 2036 H St.
Schooley Hall 2121 H St
Smith Center 600 22nd St
38 Staughton Hall 707 22nd St
39 Stockton Hall 720 20th St
40 Strong Hall 620 21st St
41 Stuart Hall 2013 G St
42 Student Health Service
43 Support Building 2025 F St
44 Thurston Hall
45 Tompkins Hall of Engineering
5 University Garage
Warwick Bldg
Woodburn House
The Dakota

50 New Residence Hall 2150 H St
51 1825 F St. (F Street Club)
52 2000 Pennsylvania Ave.
53 2100 Pennsylvania Ave.
54 2100 F St.
Bldg. D
Bldg. E 2001 G St
Bldg. H 2000 G St
58 Bldg. J 2131 G St. (rear)
59 Bldg. K 817 23rd St.
60 Bldg. L 2129 G St. (rear)
61 Bldg. O 2106 G St.
62 Bldg. P 2108 G St.
63 Bldg. V 2114 H St. (rear)
Bldg. W 2024-26 G St. (rear)
Bldg. X 2112 G St.
66 Bldg. Y 2131 G St.
67 Bldg. AA 2129-33 Eye St.
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69 Bldg. EE 2129-33 Eye St. (rear)
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Special Information

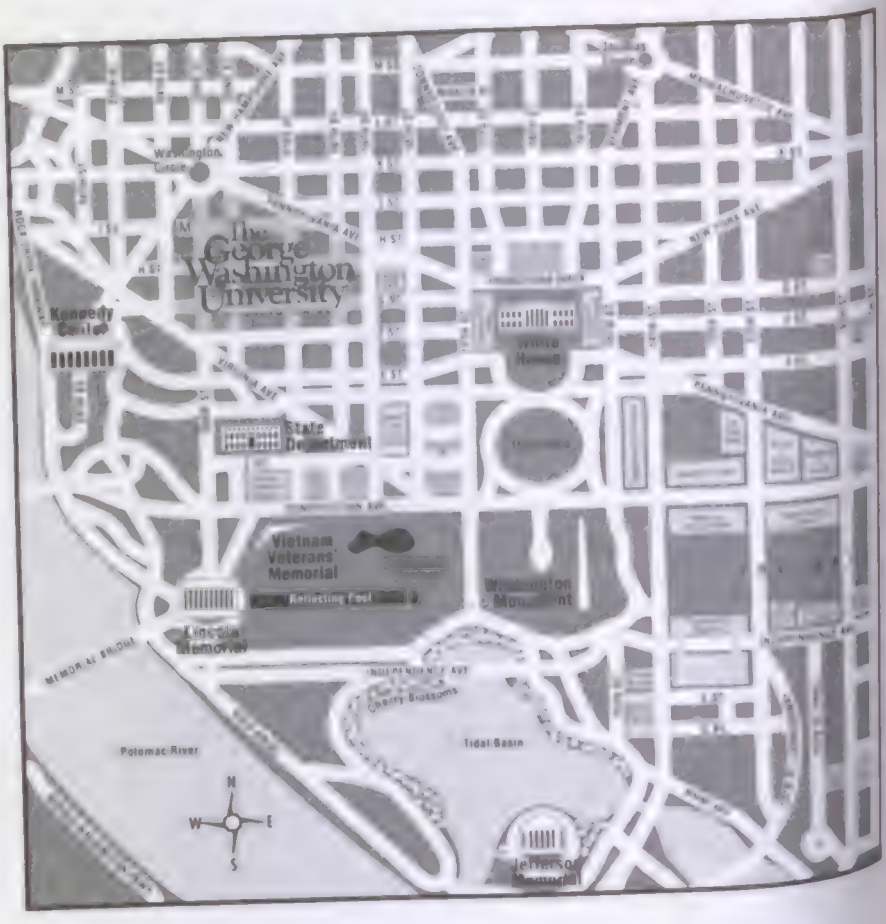
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Graduate Programs 1998-1999



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The George Washington University Bulletin



GRADUATE PROGRAMS 1998–1999

Columbian School of Arts and Sciences
School of Business and Public Management
Graduate School of Education and Human Development
School of Engineering and Applied Science
Elliott School of International Affairs

Please address correspondence to the office concerned at The George Washington University, Washington, D.C. 20052; telephone (202)994-1000. For information concerning Undergraduate Programs, the Law School, the School of Medicine and Health Sciences, the School of Public Health and Health Services, or the Summer Sessions, please request the appropriate Bulletin.

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喬治華盛頓大學願回答你的問題，如果書內沒有解答，請用英文書面詢問。地址見第一頁

お問い合わせありがとうございました　同封の大学ガイドで不明の点は1ページ記載の各学部宛に英語でお問い合わせ下さい。

저희 대학에 관심을 가져주셔서 감사합니다. 혹시 이 책자에서 언급되지 않은 면에 대하여 의문나는 점이 있으시면 앞에 명기된 조지 워싱턴 대학교 주소로 영어로 문의해 주시기 바랍니다.

جامعة جورج واشنطن ترحب بكم وتشكر لكم اهتمامكم. يرجاء الكتابة إلينا باللغة الانجليزية على عنواننا بالصفحة الأولى إذا كان لديكم أية استفسارات أخرى.

La Universidad de George Washington le agradece su interés. Si necesita información adicional a la incluida en este Boletín, por favor, diríjase por escrito, en inglés, a la dirección de George Washington University indicada en la primera página de esta publicación.

Information in this Bulletin is generally accurate as of fall 1997. The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.

Program information appears under the name of the department or program concerned in Columbian School of Arts and Sciences and the Elliott School of International Affairs. For the School of Business and Public Management, the Graduate School of Education and Human Development, and the School of Engineering and Applied Science, program information appears under the school's entry.

CONTENTS

5 The Academic Calendar
7 The University
16 Columbian School of Arts and Sciences
26 School of Business and Public Management
41 Graduate School of Education and Human Development
53 School of Engineering and Applied Science
67 Elliott School of International Affairs
75 Courses of Instruction
77 Accountancy
79 Administrative Sciences
82 American Studies
85 Anatomy and Cell Biology
85 Anthropology
89 Applied Science
89 Art
93 Art Therapy
95 Biochemistry and Molecular Biology
97 Biological Sciences
99 Biomedical Sciences
100 Biostatistics
100 Chemistry
103 Civil, Mechanical, and Environmental Engineering
116 Computational Sciences
116 Counseling/Human and Organizational Studies
121 East Asian Languages and Literatures
121 East Asian Studies
122 Economics
127 Educational Leadership
133 Electrical Engineering and Computer Science
147 Engineering Management
152 English
154 Environmental and Resource Policy
155 Epidemiology
156 European Studies
156 Finance
159 Forensic Sciences
164 Genetics
165 Geobiology
165 Geography
167 Geology
169 History
173 Human Sciences
174 International Affairs
176 International Business
178 International Development Studies
178 International Trade and Investment Policy
179 Latin American Studies
179 Legislative Affairs
179 Management Science
187 Marketing
188 Master of Business Administration
189 Mathematics
192 Microbiology and Immunology
193 Molecular and Cellular Oncology

194 Museum Studies
195 Neuroscience
196 Operations Research
199 Pharmacology
200 Philosophy
201 Physics
203 Political Management
206 Political Psychology
207 Political Science
212 Professional Psychology
215 Psychology
219 Public Administration
222 Public Policy
223 Radiological Sciences
224 Religion
226 Romance Languages and Literatures
226 Russian and East European Studies
226 Science, Technology, and Public Policy
227 Security Policy Studies
227 700 Series
227 Sociology
229 Speech and Hearing
232 Statistics
235 Strategic Management and Public Policy
237 Teacher Preparation and Special Education
246 Telecommunication
247 Theatre and Dance
248 Tourism and Hospitality Management
249 University Professors
252 Virginia Campus
257 Women's Studies
259 Faculty and Staff of Instruction
312 Research Centers and Institutes
313 Division of University Programs
316 Summer Sessions
316 Student Services
321 Financial Aid
326 Prizes
328 University Regulations
335 Fees and Financial Regulations
339 Index

THE ACADEMIC CALENDAR 1998–1999

August 1998

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

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S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
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6	7	8	9	10	11	12
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1998	**Fall Semester**
August 20–21	Advising and testing begin for entering students
August 24	Classes begin
August 24–28	Late registration
September 7	Labor Day (holiday)
October 1	Applications due for winter graduation
October 12	Columbus Day (holiday)
November 4	Registration for spring semester classes begins*
November 25–27	Thanksgiving holiday
December 7	Last day of regular fall semester classes
December 8	Makeup classes
December 9–11	Reading period
December 14–22	Examination period

*Registration dates are tentative, consult the *Schedule of Classes*

1999	**Spring Semester**
January 8	Advising and testing for entering students
January 11	Classes begin
January 11–15	Late registration
January 18	Martin Luther King Day (holiday)
February 1	Applications due for May graduation
February 15	George Washington's birthday observed (holiday)
March 15–19	Spring recess
March 31	Registration for fall semester classes begins*
April 26	Last day of regular spring semester classes
April 27	Designated Monday
April 28	Makeup classes
April 29–30	Reading period
May 3–11	Examination period
May 16	Commencement

*Registration dates are tentative; consult the *Schedule of Classes*

THE UNIVERSITY

History

The George Washington University had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of 50 shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended a "fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of 46 acres between the present 14th and 15th Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between 13th and 15th Streets.

During the last half-century, the University's campus has been developed in that section of the old First Ward familiarly known as Foggy Bottom, between 19th and 24th Streets, south of Pennsylvania Avenue. The area has many reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 I Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for 50 years the pastor of a church at 19th and I Streets, and Washington selected 23rd and E Streets as the site of the National University he hoped to see established.

Location

The University's main campus is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the National Academy of Sciences, the John F. Kennedy Center for the Performing Arts, and many other governmental and cultural institutions. GW's Virginia campus, initiated for graduate studies, research projects, and professional development programs, is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

Mission Statement

The George Washington University, an independent academic institution chartered by the Congress of the United States in 1821, dedicates itself to furthering human well-being. The University values a dynamic, student-focused community stimulated by cultural and intellectual diversity and built upon a foundation of integrity, creativity, and openness to the exploration of new ideas.

The George Washington University, centered in the national and international crossroads of Washington, D.C., commits itself to excellence in the creation, dissemination, and application of knowledge.

To promote the process of lifelong learning from both global and integrative perspectives, the University provides a stimulating intellectual environment for its diverse students and faculty. By fostering excellence in teaching, the University offers outstanding learning experiences for full-time and part-time students in undergraduate, graduate, and professional programs in Washington, D.C., the nation, and abroad. As a center for intellectual inquiry and research, the University emphasizes the linkage between basic and applied scholarship, insisting that the practical be grounded in knowledge and theory. The University acts as a catalyst for creativity in the arts, the sciences, and the professions by encouraging interaction among its students, faculty, staff, alumni, and the communities it serves.

The George Washington University draws upon the rich array of resources from the National Capital Area to enhance its educational endeavors. In turn, the University, through its students, faculty, staff, and alumni, contributes talent and knowledge to improve the quality of life in metropolitan Washington, D.C.

University Policy on Equal Opportunity

The George Washington University does not unlawfully discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, veteran status, or sexual orientation. This policy covers all programs, services, policies, and procedures of the University, including admission to education programs and employment. The University is subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Associate Vice President for Human Resources, The George Washington University, Washington, D.C. 20052, (202)994-4433, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

The Schools

The George Washington University includes eight academic units, as follows.

Columbian School of Arts and Sciences offers undergraduate programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music and graduate programs leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Science, Master of Science in Forensic Science, Master of Philosophy, Doctor of Philosophy, and Doctor of Psychology.

The School of Medicine and Health Sciences offers programs leading to the degrees of Bachelor of Science in Health Sciences, Master of Science in Health Sciences, and Doctor of Medicine.

The Law School offers programs leading to the degrees of Juris Doctor, Master of Laws, and Doctor of Juridical Science and special programs in continuing legal education.

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: civil engineering, com-

engineering, computer science, electrical engineering, mechanical engineering, and systems analysis and engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Management, Engineer, Applied Scientist, and Doctor of Science.

The Graduate School of Education and Human Development offers programs leading to the degrees of Master of Arts in Education and Human Development, Master of Arts in Teaching, Master of Education, Education Specialist, and Doctor of Education.

The School of Business and Public Management offers undergraduate programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration and graduate programs leading to the degrees of Master of Accountancy, Master of Business Administration, Master of Public Administration, Master of Science in Finance, Master of Science in Information Systems Technology, Master of Science in Professional Accounting, Master of Science in Project Management, Master of Taxation, Master of Tourism Administration, and Doctor of Philosophy.

The Elliott School of International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degrees of Master of Arts and Master of International Policy and Practice.

The School of Public Health and Health Services offers programs leading to the degrees of Bachelor of Science, Master of Science, Master of Public Health, Master of Health Services Administration, Specialist in Health Services Administration, and Doctor of Public Health.

Accreditation

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. The Commission on Accreditation of Allied Health Education Programs has accredited the health sciences programs in diagnostic medical sonography and physician assistant. The clinical laboratory science program is accredited by the National Accrediting Agency for Clinical Laboratory Science. The Joint Review Committee for Nuclear Medicine Technology has accredited the nuclear medicine technology program. The radiation therapy program is accredited by the Joint Review Committee on Education in Radiologic Technology. The public health programs have full accreditation from the Council on Education for Public Health. The program in health services administration is accredited by the Accrediting Commission on Education for Health Services Administration. All undergraduate engineering curricula of the School of Engineering and Applied Science are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The computer science curriculum is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board. The Graduate School of Education and Human Development is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its eligible master's and doctoral degree programs: the master's programs in school and community counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs; the master's program in reha-

bilitation counseling is accredited by the Council on Rehabilitation Education. The School of Business and Public Management joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business; the Assembly accredited its undergraduate program in 1977 and its master's program in 1982. The programs in accountancy satisfy the educational requirements for the Certified Public Accountant and the Certified Management Accountant professional examinations. The Master of Public Administration program is on the approved list of the National Association of Schools of Public Affairs and Administration. The Department of Chemistry is on the approved list of the American Chemical Society. The Department of Music is an accredited member of the National Association of Schools of Music. The graduate program in clinical psychology in the Department of Psychology is on the approved list of the American Psychological Association. The graduate program in speech-language pathology and audiology is accredited by the Education and Training Board of the Boards of Examiners in Speech-Language Pathology and Audiology.

Consortium of Universities of the Washington Metropolitan Area

The George Washington University is a member of the Consortium of Universities of the Washington Metropolitan Area. Ten universities in the Washington area—American University, Catholic University of America, Gallaudet University, George Mason University, George Washington University, Georgetown University, Howard University, Marymount University, the University of the District of Columbia, and the University of Maryland—are associated in a Consortium through which they coordinate the use of their respective facilities. Mount Vernon College and Trinity College are associate members of the Consortium. Students in approved programs leading to degrees in any one of these institutions have the opportunity to select from the combined offerings the particular courses that best meet their needs. This privilege is subject to regulations of the school in which the student is enrolled. Participation is limited to degree candidates. Law and medical students are excluded from participation except for LL.M. candidates. See the *Schedule of Classes* for specific regulations and information concerning registration for Consortium courses.

Registration forms and instructions are available from the registrar of the institution in which the student is enrolled. Students register and pay tuition at their own institutions for all Consortium courses; course fees are payable to the visited institutions.

The University Libraries

The library collections of the University are housed in the Melvin Gelman Library (the general library of the University) and in the Jacob Burns Law Library and the Paul Himmelfarb Health Sciences Library.

These collections contain more than 1,700,000 volumes. University appropriations supplemented by endowments and gifts provide research materials in the social sciences, the humanities, the sciences, and business. Gifts from many sources have enriched the collections, including a large National Endowment for the Humanities grant to strengthen the University's humanities holdings. The libraries hold over 18,000 serials.

Information concerning the use of the libraries may be obtained from the GW Information System, Gelman home page, and at library service desks. Individual and class instruction in the use of the library and orientation to its facilities are given by librarians upon request as well as through print, media, and computer-assisted instruction. The libraries strive to fulfill the curricular and research needs and interests of the students. Through computerized searches of bibliographic databases, students identify and locate desired research materials not easily found through more traditional methods. The staff

assists all members of the University in using the rich resources of the Washington area and the unusual opportunities they offer for extensive research.

Students, faculty, and staff at George Washington University (except law and medical students) may borrow directly from the main campus libraries of six other academic institutions in the Washington Research Library Consortium (WRLC). Students may also obtain books and journal articles on interlibrary loan from other libraries in the area and throughout the United States.

ALADIN is the electronic library resource of WRLC and contains the combined on-line catalog of the seven member universities with more than 4.3 million records, as well as a rich array of electronic databases, indexes, and full texts. ALADIN can be accessed from numerous computers in the libraries as well as remotely from on and off campus.

GW Television

The primary television resource of the University is GW Television, a state-of-the-art multichannel broadcast and production facility. GW Television develops courses and programs in cooperation with academic departments for broadcast on and off campus over various satellite and cable networks; produces videotapes for class use and for continuing professional education; offers national and international satellite videoconferencing; operates the George Washington University Television Network (GWUTN); and is developing compressed video links between remote campus locations.

GW Television has both C and Ku-band satellite reception capabilities and can deliver programs received via satellite to many on-campus locations.

General Alumni Association

The objectives of this organization are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Membership in the Association is conveyed automatically to anyone who has been graduated from any school or division of the University. Anyone who has earned 15 credit hours or the equivalent at the University, who has left the University in good standing, and whose class has graduated is eligible for membership; in the case of the Division of University Programs students, however, only the "15 credit hours earned" requirement and not the "graduation of the class" requirement applies. Graduates of Center for Career Education certificate programs are also eligible.

A Governing Board, composed of members representing the constituent alumni organizations, directs the activities of the Association. The voluntary leadership of the Association works closely with the staff of the Office of Alumni Relations in carrying out Association affairs. The Association may be contacted through the Office of Alumni Relations.

The Board of Trustees of the University

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member. Trustees who are GW alumni are indicated by an asterisk. Locations are indicated for trustees outside the Washington metropolitan area.

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Introduction

The George Washington University awarded its first Doctor of Philosophy degree in 1888, one of the first institutions in the United States to do so. In 1892, the School of Graduate Studies was instituted. A number of organizational entities followed and, in 1965, after several decades of growth in a number of departments, the Graduate School of Arts and Sciences was established. All undergraduate and graduate education and research programs in the arts and sciences were combined in 1992 under one administration with the formation of the Columbian College and Graduate School of Arts and Sciences, simplified to Columbian School of Arts and Sciences in 1995.

All graduate programs in the arts and sciences, leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Science, Master of Science in Forensic Science, Master of Philosophy, Doctor of Psychology, and Doctor of Philosophy, are administered by Columbian School.

The faculty of Columbian School sets requirements for admission, provides courses and programs of advanced study and research, and establishes academic standards for its degrees.

Admission Requirements

Applicants must hold an undergraduate degree from an accredited institution of higher learning. Applicants should have academic backgrounds of excellence, usually with majors, or equivalent, in the fields in which they intend to study for advanced degrees. Normally, a *B* average (or equivalent) from an accredited college is required. With evidence of special promise, such as high Graduate Record Examination scores, an applicant whose academic record falls short of a *B* average may be accepted on a conditional basis. Meeting the minimum requirements does not assure automatic acceptance. The departments may, and often do, set higher admission standards. Moreover, the number of spaces available for new graduate students limits the number that can be accepted. Students who apply in their senior year must have completed their baccalaureate work before registration in Columbian School and must present evidence of such completion. Applicants should be aware that graduate courses taken prior to admission while in nondegree status are not used in assessing admissibility to degree programs.

With the exception of those applying to M.F.A. degree programs, all applicants are required to submit scores on the GRE general test. In addition, some programs require scores on a GRE subject test (see the Columbian School section of the Graduate Admissions Application). The applicant must have the Educational Testing Service send the required score reports directly to Columbian School of Arts and Sciences. GRE scores are only valid for five years.

The following additional requirements pertain to all applicants from countries in which English is not an official language:

1. Applicants who do not hold a degree from a regionally accredited U.S. institution of higher learning are required to submit scores from the Test of English as a Foreign Language (TOEFL). The Test of Written English (TWE) is also recommended. The required minimum TOEFL score for admission to a graduate degree program is 550.

2. Applicants for graduate teaching assistantships are required to submit scores on the TOEFL. To be considered for an assistantship, the applicant must have a minimum score of 600 on the TOEFL.

3. Applicants admitted as degree candidates will be required to take the English as a Foreign Language (EFL) Placement Test at The George Washington University before registering. (Those who score 600 or more on the TOEFL are exempted.) Depending on the applicant's performance on the placement test, EFL course work may be required.

Application for Admission—Full information is available in the Graduate Admissions Application.

Readmission—A student who wishes to resume a graduate program that had been interrupted must file an application form and provide supporting documentation to be considered for readmission. Readmission is not guaranteed, and the application is subject to review by the department concerned and the dean. The student may be required to take additional course work and qualifying examinations on the course work completed. Application forms are available from the Oxborough Student Services Center.

Regulations

See Fees and Financial Regulations: University Regulations.

The Oxborough Student Services Center publishes a Graduate Student Handbook each academic year that contains additional updated information on the School's policies, regulations, and other matters of concern to enrolled or admitted students. It is the responsibility of the student to be aware of the information contained both in this Bulletin and the Handbook.

Grades

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *CR*, Credit; *F*, Fail; *I*, Incomplete; *IPG*, In Progress; *W*, Authorized Withdrawal; *Z*, Unauthorized Withdrawal. Other grades that may be assigned are *A*−, *B*+, *B*−, *C*+, and *C*−.

The grade of *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work for a course. Conditional students may not receive a grade of *I*. The Incomplete must be made up before the lapse of one calendar year. An Incomplete for regular course work that is not changed within one calendar year remains permanently as a grade of *I* on the student's record. The grade of *I* cannot be removed by reregistering for the course here or by taking its equivalent elsewhere.

The grade of *IPG* is given for all thesis and dissertation research courses until the thesis or dissertation is completed. Upon the satisfactory completion of the thesis or dissertation, the grade *IPG* is automatically changed to *CR*. The grade of *CR* may be given for Advanced Reading and Research courses and independent research courses.

Scholarship Requirements

Graduate students are required to maintain a minimum cumulative grade average of *B* (3.0) in all course work taken following admission to a graduate program in the School. Individual departments may require a higher average; the Department of English requires a 3.25 grade-point average for master's candidates and a 3.5 average for doctoral candidates. Only graduate course work that is taken at the University and that forms part of the student's program of studies may be included in the grade-point average.

In the case of a student who receives a grade of *F* for a course in the program of studies, the Oxborough Student Services Center will require a written statement from the department justifying the student's continuance in the School and outlining the program to be followed. Continuation is contingent upon the dean's approval. When a grade of *F* is received for a course in the program of studies, the grade is included in the student's grade-point average whether or not the course is repeated.

A student may repeat a course in which a grade of *C* or above was received only when permitted to do so by the department concerned, unless the course description states that the course may be repeated for credit. A written statement of permission must be submitted for approval to the Oxborough Student Services Center by the appropriate departmental advisor. It is then filed with the Registrar. If a course is repeated, the first grade received remains on the student's record and is included in the student's grade-point average.

A graduate student may take an advanced undergraduate course (courses numbered 101–200) for graduate credit only upon the approval of the dean and the department at the time of registration. Such approval is granted only with the provision that the student complete additional work in order to receive graduate credit.

Program of Studies

The program of studies is a formal statement of the requirements to be met in completing a specific degree program as well as the dates by which each requirement must be completed. The program of studies form is obtained from the Oxborough Student Services Center at the time of the first registration. It must be completed in consultation with the departmental advisor and submitted for approval to the Oxborough Student Services Center by the indicated date. A master's candidate's program of studies is due during the first semester of study, and a Ph.D. candidate's program of studies is due during the second semester of study. A program of studies may be revised, when necessary, by obtaining the approval of the departmental advisor and the dean. The revision must be filed in the Oxborough Student Services Center. A completed course cannot be dropped from the program of studies unless its inclusion was due to an error in advising or an administrative error. Such a change in the program requires the approval of the dean.

It is especially important for those admitted with conditions to consult with their departmental advisors as early as possible regarding completion of the additional requirements specified in the letter of admission. The exact conditions for admission must be satisfied.

Academic Work Load—Full-time students register for 9 to 12 credit hours each semester; part-time students must register for 6 credit hours each semester. These requirements do not apply to students who have fewer than 9 credit hours (full time) or 6 credit hours (part time) remaining to complete their programs. No more than 15 credit hours may be taken during any one semester. Students who are employed more than 20 hours per week are expected to apply for part-time academic progams, and they will not be permitted to register for more than 6 credit hours in any semester.

Continuing Research

All students must be continuously enrolled while working toward a degree, except during the summer sessions. (A few programs may require summer attendance as well.) Students who have completed all course work, specific departmental requirements, thesis, and dissertation registration requirements are within their program of studies deadline must register for continuing research each semester during the registration period. If continuous enrollment is not maintained, the student is dropped from the degree program unless a leave of absence is granted by the Oxborough Student Services Center.

Leave of Absence

A student who, for personal reasons, is temporarily unable to continue the program of studies may request leave of absence for a specific period of time, not to exceed two semesters during the total period of degree candidacy. A leave

request is approved, the student must register for leave of absence each semester. If a student fails to register, degree candidacy is terminated.

Withdrawal

Students who wish to withdraw from their degree program should inform the Oxborough Student Services Center in writing. The last day for *complete* withdrawal without academic penalty is at the end of the eighth week of classes in the fall and spring semesters. A course dropped during the first four weeks of classes does not appear on the student's transcript; a course dropped after the fourth week but before the eighth week is assigned the grade of W (Authorized Withdrawal).

Graduation Requirements

All students must file an Application for Graduation by the date indicated in the University Calendar for the semester or summer session in which they intend to graduate. Students must be registered in the School during the semester or summer session in which they plan to graduate. Degrees are conferred in January, May, and September. Students who have completed the requirements for a degree but have not yet been awarded the degree will be issued a letter to this effect upon request. A commencement ceremony is held annually in May.

Degrees

Listed below are the graduate degree programs of Columbian School of Arts and Sciences and the specific degrees offered, by field. The programs are directed by the departments concerned. Degree programs that bridge two or more departments are directed by committees composed of members of the departments concerned. For further information write to the dean or the chair of the appropriate department.

Graduate Fields

The graduate course work offered in support of the degree programs in the following list is shown by department in this Bulletin.

Humanities	Degrees Offered	
American Studies	M.A.	Ph.D
American Literature	M.A.	Ph.D
Art History	M.A.	Ph.D
English Literature	M.A.	Ph.D
Fine Arts	M.F.A.	
Ceramics, Design, Painting, Photography, Printmaking, Sculpture, Visual Communication		
Human Sciences		Ph.D.
Museum Studies	M.A.	
Religion	M.A.	
Theatre	M.F.A.	
Women's Studies	M.A.	
Social and Behavioral Sciences		
Administrative Sciences		
Human Resource Management	M.A.	
Organizational Management	M.A.	
Anthropology	M.A.	
Art Therapy	M.A.	
Criminal Justice	M.A.	
Economics	M.A.	Ph.D
Geography	M.A.	
History	M.A.	Ph.D

Legislative Affairs	M.A.	
Political Management	M.A.	
Political Science	M.A.	Ph.D.
Professional Psychology		Psy.D.
Psychology	M.A.	Ph.D.
Public Policy	M.A.	Ph.D.
Environmental and Resource Policy	M.A.	
Philosophy and Social Policy	M.A.	
Women's Studies	M.A.	
Sociology	M.A.	
Speech–Language Pathology and Audiology	M.A.	
Telecommunication	M.A.	
Natural, Mathematical, and Biomedical Sciences		
Applied Mathematics	M.A., M.S.	
Biological Sciences	M.S.	Ph.D.
Biology, Botany, Zoology		
Biomedical Sciences		
Biochemistry	M.S.	Ph.D.
Genetics	M.S.	Ph.D.
Molecular and Cellular Oncology		Ph.D.
Neuroscience		Ph.D.
Pharmacology		Ph.D.
Biostatistics	M.S.	Ph.D.
Chemical Toxicology	M.S.	
Chemistry	M.S.	Ph.D.
Epidemiology	M.S.	Ph.D.
Forensic Sciences	M.F.S., M.S.F.S.	
Geobiology	M.S.	Ph.D.
Geochemistry	M.S.	
Geology	M.S.	Ph.D.
Industrial and Engineering Statistics	M.S.	
Mathematics	M.A.	Ph.D.
Physics	M.A.	Ph.D
Radiological Sciences		Ph.D.
Statistics	M.S.	Ph.D.

Joint Doctor of Medicine/Doctor of Philosophy Program

A joint program is available to qualified students who seek both the Doctor of Medicine and Doctor of Philosophy degrees. The requirements that must be fulfilled for both degrees are identical to those currently and separately established in the School of Medicine and Health Sciences and Columbian School of Arts and Sciences.

A student working toward these degrees may apply a maximum of 24 credit hours of approved course work in the School of Medicine and Health Sciences toward the minimum of 48 hours of course work required to qualify for the General or Cumulative Examination for doctoral candidacy. This course work is normally taken during the semesters that alternate with the medical program and in the years following the award of the M.D. degree. The student's research for the dissertation may begin concurrently with the final 24 credit hours of graduate course work leading to the General or Cumulative Examination. The estimated time for the completion of this dual program is six years.

In order to enter the joint program, a prospective student must first apply to and gain admission both to Columbian School and to the School of Medicine and Health Sciences separately through established procedures. Upon admission to both schools, the student may then apply for affiliation with the joint program. Work toward the Doctor of Philosophy degree is performed under the jurisdiction of a departmental doctoral committee.

Requirements for the Degrees

The Master's Programs

Unless otherwise specified, the requirements listed below are applicable to candidates for the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Science, and Master of Science in Forensic Science.

1. *General Requirements*—For a master's degree program including a thesis, the satisfactory completion of a minimum of 30 credit hours of approved graduate work, including 6 credit hours of thesis research, is required. For a master's degree program that does not include a thesis, the number of credit hours of approved graduate course work is determined by the department and normally consists of from 30 to 36 credit hours. The program without the thesis is not an individual student option and is not available in every department. Departments can and often do set requirements above the minimum required by Columbian School. Work taken to make up deficiencies is never counted as part of the requirements leading to a master's degree.

Upon approval, up to one-half of the required graduate work may be taken in courses offered by another degree-granting division of this University. With approval, up to nine hours of work toward a master's degree may be taken in courses offered by the other affiliated institutions of the Consortium of Universities of the Washington Metropolitan Area. In all cases, at least one-half of the hours counting toward the master's degree must be in courses offered by the Columbian School of Arts and Sciences. If credit is transferred from another institution (see Transfer of Credit, below), the number of credit hours which may be taken at an affiliated Consortium institution is reduced by the number of hours accepted as transfer credit.

All master's degree candidates must complete degree requirements by the calendar date specified in the program of studies, which in no case will exceed four years. Extensions beyond the specified time period may be granted in exceptional circumstances, but the student will be required to register and pay for 6 credit hours of Reading and Research for the grade of Audit each semester.

2. *Transfer of Credit*—A maximum of one-quarter of the credit hours of graduate course work required for a degree may be approved for transfer to a graduate program in Columbian School from the Division of University Programs, another degree-granting division of this University, or another accredited college or university. For a transfer of credit to be approved, *all* of the following conditions must be met: the course work must be from an accredited institution and must have been taken within the two years prior to admission to the School, it must be approved as part of the student's program of studies, it must not have been applied to the completion of requirements for another degree, it must be post-baccalaureate graduate-level course work, and the student must have received a grade of *B* or better in each course for which a transfer of credit is requested. This action must be requested in writing and approved by the departmental advisor and the dean. A transcript of the course work must be on file before the request can be considered.

Once enrolled as Columbian School of Arts and Sciences degree candidates, students are not permitted to transfer course work taken outside the University, except under extraordinary circumstances.

3. *Special Program Requirements*—Master's degree candidates in some programs must demonstrate a reading knowledge of an appropriate foreign language. In other programs, students must demonstrate competence in quantitative methods, normally by passing prescribed courses in Statistics/Statistical Computing. Other programs have special requirements in other subjects. Courses taken at the undergraduate level to fulfill these requirements may not be counted in the number of graduate credit hours required for these programs. For further information on these and other regulations, consult the Graduate Student Handbook and the departments and program faculty concerned.

4. *The Thesis*—The main purposes of a master's thesis are to demonstrate the student's ability to make independent use of information and training and to furnish objective evidence of constructive powers in a chosen field. The student registers for six credit hours of thesis research and must complete the thesis no later than four calendar years after matriculation as a candidate for the master's degree. Registration for thesis research entitles the student to the advice and direction of the member of the faculty under whom the thesis is to be written. The thesis subject must be approved by the faculty member who will be directing the thesis. A thesis topic approval form must be submitted to the Oxborough Student Services Center upon registration for thesis research. The thesis—in its final form, with one copy and a certificate of approval signed by the thesis director and by at least one departmental reader—must be presented to the dean no later than the date announced in the University Calendar. All theses must meet the form, style, and other requirements set forth in a pamphlet, *Information Concerning Master's Theses and Doctoral Dissertations*, available in the Oxborough Student Services Center.

5. *Master's Comprehensive Examination*—Most master's degree candidates must pass a Master's Comprehensive Examination in the major subject. Examinations are held on dates fixed by the departments, so that results can be filed in the Oxborough Student Services Center no later than the day before the faculty meets to approve the list of graduates. The nature and form of the examination is the responsibility of the department or program.

A student who fails to pass the Master's Comprehensive Examination may, with the approval of the department and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted, and the student's degree candidacy is terminated.

The Doctor of Philosophy Program

The minimum requirements for this doctoral program are as follows:

1. *General Requirements*—The program leading to the degree of Doctor of Philosophy requires the satisfactory completion of a minimum of 72 credit hours of approved graduate work for entering students whose highest earned degree is a baccalaureate. A minimum of 48 of these hours must be taken in preparation for the General Examination. Entering students whose highest earned degree is a master's degree are required to register for a minimum of 48 credit hours of approved graduate work, no fewer than 24 of which must be taken in preparation for the General Examination. A maximum of 12 credit hours may be taken in courses offered by the other affiliated members of the Consortium of Washington Area Universities. While completing the dissertation portion of the program, the student must register for 12 to 24 credit hours of dissertation research, depending on the number of hours completed prior to the General Examination. The exact number of credit hours required for any part of the total program is assigned by each department and may exceed the minimum required by the Columbian School.

Ph.D. candidates have an overall eight-year time limit for completion of all degree requirements. Students in the first unit of their programs shall meet the calendar deadline for completing this unit as specified in their program of studies. Completion of the first unit includes satisfactory completion of course work, special program requirements, and the General Examination. Doctoral students in the second unit of their programs, i.e., dissertation research, shall have an approved topic on file in the Oxborough Student Services Center by the date specified in the program of studies, which in no case will exceed two years after the completion date of the General Examination. All remaining doctoral degree requirements shall be completed by the date specified in the program of studies, which in no case will exceed five years from the completion date of the General Examination. If any of the deadlines specified above are not met, the

assuming academic approval for an extension which may be granted in exceptional circumstances, the student must register and pay for up to 6 credit hours of Reading and Research for the grade of Audit each semester. These hours will not be counted toward completion of the degree.

2. *Transfer of Credit*—Entering students who hold a master's degree relevant to the proposed doctoral field of study may request transfer of up to 24 hours of credit toward a doctoral degree for acceptable post-baccalaureate graduate work taken at the master's degree level at The George Washington University or another accredited college or university. For those who do not hold the master's degree, a maximum of 24 hours of credit may be transferred, provided the conditions listed under The Master's Programs (Item 2) above are met.

3. *Special Program Requirements*—Certain doctoral programs require a reading knowledge of one or two appropriate foreign languages, or high proficiency in one language. Some require a reading knowledge of one language in addition to competence in quantitative or other subject matter; some require competence in other subject matters without a language requirement. Competence in quantitative methods is normally demonstrated by passing certain prescribed courses in Statistics/Statistical Computing. Courses taken at the undergraduate level to fulfill special program requirements may not be counted in the number of graduate credit hours required for the student's doctoral program, except that up to 6 hours of course work at the 100 level may be so counted, with the approval of the department and the dean, so long as the number of hours of dissertation credit in the student's program is 12 or more. For further information on these and other regulations, consult the Graduate Student Handbook and the departments and program faculty concerned.

4. *The General Examination*—Each student is required to complete the General Examination no later than the semester following the completion of course requirements. The General Examination is composed of a written examination five to six hours in length in each of the areas of study comprising the student's total program, the time permitted between each examination is determined by the administering department. Some departments permit one or two areas of study to be "written off", that is, a special, shorter examination is given after a year of course work in the area. A cumulative examination system is in effect in the fields of chemistry and mathematics; students in these fields should consult the department for information.

A student who fails to pass any part of the General Examination may, with the approval of the department and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted. The student's degree candidacy will be terminated.

Satisfactory performance on the General Examination is required for admission to the second unit of the Doctor of Philosophy degree program, consisting of the dissertation and final examination. Admittance to the second unit is permitted only if the student's General Examination committee finds that the student's performance on the examination and in course work gives a good indication of success in the second unit. Passing of the examination at the minimum level does not necessarily give this indication.

5. *The Degree of Master of Philosophy*—Upon departmental recommendation and approval of the dean, the degree of Master of Philosophy may be awarded to students who have successfully completed all requirements for the Doctor of Philosophy degree up to and including the General Examination. Not all departments recommend students for this degree.

6. *The Dissertation and Final Examination*—A dissertation is required of each doctoral candidate as evidence of ability to perform scholarly research and interpret its results. The candidate normally enrolls for Dissertation Research upon completion of Unit I; however, the candidate may register for up to 6 credit hours of Dissertation Research during Unit I. If the dissertation is not

completed within five years from the date the General Examination is completed, the student will be required to request an extension to continue. If the extension is approved by the department and the dean, the student may be required to register for 6 credit hours of Reading and Research for the grade of Audit and to retake the General Examination.

When the dissertation has been approved by the director, members of the Dissertation Research Committee, and the dean, the candidate takes the Final Examination, an oral examination that is open to the public. A committee of examiners (composed of Columbian School faculty and, when appropriate, outside scholars) conducts the examination. A sufficient number of copies (usually seven) of the dissertation must be provided by the candidate for the members of the Examination Committee. If the candidate passes, he or she is recommended to Columbian School for the degree of Doctor of Philosophy.

No later than the date specified in the University Calendar, the candidate must submit to the Oxborough Student Services Center the original and one copy of the dissertation and an abstract for inclusion in the Announcement of the Final Examination and for reproduction by University Microfilms, Inc.

Detailed information regarding regulations for the form and reproduction of the dissertation is available in the Oxborough Student Services Center. The successful candidate for the doctorate is required, before receiving the degree, to pay a fee that is applied toward the expense of printing the Announcement of the Final Examination and the basic service rendered by University Microfilms, Inc.

The Doctor of Psychology Program

The minimum requirements for this doctoral program are as follows:

1. *General Requirements*—The program leading to the degree of Doctor of Psychology requires the satisfactory completion of a minimum of 87 credit hours of approved graduate work for entering students whose highest earned degree is a baccalaureate. Advanced standing may be awarded for graduate-level course work based on consultation with an academic advisor. A maximum of 12 credit hours may be taken in courses offered by the other affiliated members of the Consortium of Universities. The number of credit hours required for any part of the total program is assigned by the program and may exceed the minimum required by Columbian School of Arts and Sciences. Doctor of Psychology degree candidates normally have an overall three-year time limit for completion of all course requirements for the degree.

2. *Transfer of Credit*—Provisions are the same as those of the Doctor of Philosophy Program, above.

3. *The General Examination*—Each student is required to complete the General Examination no later than the beginning of the final semester of the program. A student who fails to pass any part of the General Examination may, in exceptional circumstances, and with the approval of the program and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted. The student's degree candidacy will be terminated.

Further information on the Doctor of Psychology degree appears under Professional Psychology in the Courses of Instruction.

Fellowships and Financial Aid

Many departments offer graduate teaching assistantships and University fellowships, and research assistantships are available in some departments. Students should check with their department concerning the availability of assistantships and fellowships. Graduate teaching assistants and University Fellows are appointed by the dean of the School, based on department recommendations. Other kinds of sponsored and University awards are also available. Awards are based on academic excellence, and only full-time graduate degree candidates

Columbian School are eligible to be considered. Doctoral candidates receive preference in the awarding of full graduate teaching assistantship fellowship packages. Most appointments are made on a year-to-year basis and are not automatically renewable. Doctoral candidates may be funded for a maximum of four years. M.A. and M.S. candidates for a maximum of two years, and M.F.A. candidates for a maximum of three years. No student will receive more than four years of University support for all graduate work.

Students applying for admission who also wish to apply for a fellowship should submit a completed application for admission by February 1. Students currently enrolled in the School should also submit the fellowship application by February 1 and should check with their departments concerning additional application requirements.

International students applying for teaching assistantships should refer to Financial Aid, International Students, for regulations governing the appointment of international graduate teaching assistants.

Forms for currently enrolled students are available at the Oxborough Student Services Center. Filing the fellowship application entitles the student to consideration for all awards available in the student's department.

Students who wish to apply for loans should indicate their intent to do so on the Graduate Admissions Application. Information concerning loans is contained in a booklet available from the University's Office of Student Financial Assistance; an overview of funding opportunities is available from the University's Office of Fellowships and Graduate Student Support.

Cooperative Programs

The American Studies Program at The George Washington University has made a cooperative arrangement with the American Studies Program of the Smithsonian Institution. Members of the staffs of the Smithsonian's American Studies Program, National Museum of American History, National Portrait Gallery, and National Museum of American Art offer seminars and tutorial instruction in fields that provide students with an unusual opportunity to develop new dimensions in the discipline of American civilization. This program of study is open to students working toward the degrees of Master of Arts and Doctor of Philosophy and is intended to prepare them for research, teaching, and museum-related careers.

The Art Department of The George Washington University has made arrangements with the Smithsonian Institution to offer graduate programs of study leading to the degree of Master of Arts in the field of art history with a concentration in museum training. The Department has made similar arrangements with the Corcoran Gallery of Art, the Freer Gallery, the Hirshhorn Museum and Sculpture Garden, the Museum of African Art, the National Museum of American Art, the Phillips Collection, the Renwick Gallery, and the Textile Museum.

The Museum Studies Program has forged strong relationships with more than forty local museums, historical houses, and government agencies. Each student is required to undertake 6 credit hours of internships—the equivalent of 520 hours of museum work. Most students elect to divide this requirement into two internships to maximize their exposure to different institutions and projects.

The George Washington University, in cooperation with two other universities and the Folger Shakespeare Library, helped establish the Folger Institute for Renaissance and 18th-Century Studies as a cooperative venture in graduate studies in the humanities. Fifteen universities are now member institutions. Seminars (limited to 12 students each) are offered each semester under the direction of American and foreign scholars. The Folger Library forms the core of the Institute. All participants enrolled in the seminars are granted access to the collections of rare books, manuscripts, and reference materials of the Library. Six registered students are eligible to apply for admission to one or more of the seminars, although priority in enrollment will be accorded graduate students

working on dissertations and postdoctoral scholars from the sponsoring institutions. Further information, including a listing of seminar topics, is available at the Folger Shakespeare Library.

Center for Washington Area Studies

The Center for Washington Area Studies serves as the focal point at the University for interdisciplinary work related to Washington and its regional context. Through teaching, advanced research, publications, and public events that include tours, exhibits, and conferences, the Center works to promote a better understanding and appreciation of the history, culture, literature, and public policies of the Washington region.

Off-Campus Degree Programs

Columbian School of Arts and Sciences currently offers the following degree programs off campus: the Master of Arts in the fields of Criminal Justice (with concentrations in Crime in Commerce and Security Management), Human Resource Management, Legislative Affairs, Organizational Management, and Telecommunication.

SCHOOL OF BUSINESS AND PUBLIC MANAGEMENT

Interim Dean J.E. Kee
Senior Associate Dean W.E. Seale
Associate Deans L.E. Graff, R.F. Dyer

Introduction

Organized as the School of Government in 1928, the School of Business and Public Management has been responsible for over half a century for the [pro]fessional development of individuals assuming leadership roles in society. [The] School comprises eight departments—Accountancy, Finance, Internat[ional] Business, Management Science, Marketing, Public Administration, Stra[tegic] Management and Public Policy, and Tourism and Hospitality Management. [The] use of a multidisciplinary approach in educational programming helps prepa[re] both the generalist and specialist for professional careers in today's complex organizational society.

Mission Statement—We believe that the creation and dissemination of knowledge is essential for effective management. Our mission is to serve current and future leaders, managers, and professionals in the global community by offering superior learning opportunities in business and public management, engaging in research and other scholarly activities to advance management theory and practice, and providing management and professional expertise to business, government, and not-for-profit organizations.

We are guided by our commitment to excellence in teaching and life-long learning, excellence in research and creation of new knowledge, meeting the distinctive needs of both part-time and full-time students; promotion of entrepreneurial spirit, intellectual and professional development of faculty and staff; diversity in students, faculty, and staff; emphasis on the interaction of public-sector and private-sector organizations; and active engagement in public discourse about the social and ethical responsibility of business.

As active and responsible citizens of our local community, the nation's capital, we acknowledge our reliance upon its wealth of resources and our commitment to help shape its future.

Academic Status

The School of Business and Public Management joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business, and the undergraduate and master's programs in business administration are accredited by the Assembly. The School is a member of the National Association of Schools of Public Affairs and Administration, and its Master of Public Administration degree program is accredited by the NASPAA Commission on Peer Review and Accreditation.

Regulations

See Fees and Financial Regulations; University Regulations.

Attendance

A student may not attend classes until registration is completed. The student is held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up the work missed. A student suspended for any cause may not attend classes at GW during the period of suspension.

Withdrawal

Withdrawal from a course or from the University without academic penalty is permitted during the first four weeks after registration for the fall or spring semester. Withdrawal after this period is permitted only in unusual circumstances and requires certification by the instructors of courses for which the student is registered that the student is doing passing work (see Withdrawal, under University Regulations).

Adding Courses

Courses may not be added after the first two weeks of classes in any semester without the specific permission of the instructor.

Independent Study Plan

A graduate student of demonstrated capacity, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of an instructor, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific credit hours normally allowed when a course is taken on a class basis. A petition outlining the student's specific study plan must be submitted to the director of graduate student advising prior to beginning any independent study. The student may petition to complete a maximum of two independent studies in two separate semesters.

Students from Other Schools Within the University

Degree candidates from other schools of the University cannot register for more than 12 hours of credit from the Master of Accountancy, Master of Taxation, Master of Science in Finance, Master of Science in Professional Accounting, or Master of Business Administration degree programs.

The Master's Degrees

Entrance Requirements

To be considered for admission, applicants must present a bachelor's degree from a regionally accredited college or university. Admission to master's programs is highly competitive. Previous academic history, performance on the applicable entrance examination, letters of reference, motivation and aptitude to do graduate-level work, and professional experience are all taken into consideration.

Applicants for admission to programs leading to the degrees of Master of Accountancy, Master of Science in Professional Accounting, Master of Taxation, and Master of Business Administration must submit scores on the Graduate Management Admission Test; applicants for admission to the Master of Science in Finance and Master of Tourism Administration degree programs must submit scores on the Graduate Management Admission Test or the Graduate Record Examination; applicants for admission to programs leading to the degree of Master of Public Administration must submit scores on the Graduate Record Examination. It is the responsibility of the applicant to make arrangements for the required test with the Educational Testing Service, Princeton, N.J. 08541. Correspondence concerning the Graduate Management Admission Test should be addressed to Box 966; concerning the Graduate Record Examination, to Box 955. Test scores that are more than five years old are not accepted for admissions review.

Additional Requirements for International Students—Students from countries where English is not an official language are required to take the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 550 is required for consideration for admission. All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on the TOEFL will be exempted from this requirement.

Depending on the test results, the student may be restricted in the number and type of courses that can be taken. Students assigned English as a Foreign Language (EFL) courses should anticipate additional related tuition expenses as well as a possible extended period of time required to complete their degree program.

Transfer Within the School—Currently enrolled students wishing to transfer from one graduate degree program to another within the School must complete a new application for admission through the Office of Graduate Admissions. Applicants for transfer are subject to requirements in effect at the time of transfer. In addition, students must submit all required credentials no later than the established completion dates for the term for which the transfer is requested. Students must be in good academic standing (3.0 grade-point average) for transfer consideration.

Readmission

A student who withdraws, is suspended, or is otherwise absent without authorization from the University for one semester or more must make formal application for readmission to the director of graduate admissions and resubmit all supporting credentials including transcripts from previous schools attended, including George Washington University, and entrance examination scores. If readmitted, the student is subject to the rules and regulations in force at the time of return. If the student has attended one or more regionally accredited colleges or universities during absence from the University, complete official transcripts must accompany the application for readmission.

The application fee is waived for a student applying for readmission who was registered as a degree candidate at the time of last registration at the University and has not since registered at another college or university.

General Requirements

All students must complete the prescribed minimum number of credit hours of graduate course work. A maximum of one-quarter of the credit hours of graduate course work required beyond core or other required prerequisite courses may be approved for transfer to the School of Business and Public Management from the Division of University Programs, another degree-granting division of this University, or another regionally accredited college or university under the following conditions: The course work must be approved as part of the student's program of studies; it must not have been applied to the completion of requirements for another degree, it must be at the graduate level, it must have been taken within the two years prior to acceptance into the program, and the student must have received a grade of *B* or better. A transcript and description of the course work must be on file before the petition can be considered. Should advanced standing be granted, the credit will count but not the grade. Only grades earned in courses in the Department of Public Administration while in nondegree status will be used in calculating the cumulative grade-point average.

Master's degrees are awarded by vote of the Faculty on completion of the required course work and completion of an acceptable thesis (if one is elected) in the chosen degree or field of concentration.

Courses numbered 101–200 may be counted toward the master's degree only when registration for graduate credit has been approved by petition at the time of registration by the director of graduate student advising. Written approval from the course instructor is also required. No work counted toward a bachelor's degree may be counted toward a master's degree; however, a student who has completed the equivalent of a Master of Accountancy, Master of Business Administration, Master of Science in Professional Accounting, or Master of Taxation core prerequisite course with a grade of *B* or better as part of the bachelor's degree program may request a waiver of that course at the master's level. A grade of *B* or better is required to waive remaining core prerequisite courses on the basis of equivalent graduate-level courses completed at GW or another regionally accredited college or university prior to admission to the program. All courses presented for waiver consideration must have been taken within five years prior to the first semester of enrollment into the program.

A full-time student may register for a minimum of 9 to a maximum of 15 credit hours each semester and 6 credit hours each summer session. A graduate student who is employed more than 20 hours a week may not take more than 9 credit hours each semester and 3 credit hours each summer session. All work for a master's degree must be completed in five years.

Students who expect to continue studies for a doctoral degree after receiving the master's degree should ask for assistance in planning their programs of study.

No credit is granted for work done in absentia or without formal instruction, except for hospital residency, supervised field experience, independent study, and the thesis, which may be completed in absentia with the permission of the department, designated faculty advisor, or committee concerned.

Scholarship Requirements

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *IPG*, In Progress; *CR*, Credit; *W*, Authorized Withdrawal; and *Z*, Unauthorized Withdrawal. Other grades that may be assigned are *A*−, *B*+, *B*−, *C*+, and *C*−.

An average of *B* or better is required for the master's degree. A minimum grade-point average of 3.0 is required for award of a graduate degree. All graduate courses and undergraduate courses taken for graduate credit after matriculation as a degree candidate (except those audited or taken for the grade of *CR*) will be used in the calculation of the grade-point average.

Probation—A student whose grade-point average falls below 3.0 after completing a minimum of 9 credit hours will be placed on probation. This probation extends through the period in which the student next attempts 12 credit hours of work, including prescribed courses. A student's program may be further restricted by the director of graduate student advising, if deemed necessary. During this period the student's performance will be monitored to determine suitability for continued study. Please note that Incomplete grades are not allowed during the probation period. A student who is subject to probation for a second time at any point during the program is automatically suspended.

Grade of F—A master's degree candidate who receives a grade of *F* is required to present cause, for consideration by the director of graduate student advising, as to why continued study should be permitted. Once a grade of *F* is earned in a core, required, or elective course, it remains a part of the student's permanent record and is calculated into the grade-point average.

A master's degree candidate given the grade of *F* in a core or other required course, and permitted to continue in graduate studies, must repeat the course and achieve at least the grade of *B*. (Such a repeat does not expunge the grade of *F*, which remains part of the student's record.) Should this level of performance not be obtained, the student will be denied further registration as a degree candidate.

Suspension

A graduate student who does not meet the conditions of probation (see above) will be suspended. A student who is suspended or withdraws under these conditions may apply for readmission after the lapse of one semester. An outstanding Incomplete grade at the time of suspension must be completed or will turn to an administrative *F*. To be readmitted the student must submit evidence that indicates academic success if readmitted. A student so readmitted will continue on academic probation and must achieve a minimum grade-point average of 3.50 in the next 12 credit hours of graduate study. Should the student fail to achieve this minimum grade-point average, a second suspension will result and subsequent readmission will be denied.

Incomplete/Withdrawal

Conditions under which the grades of *I* (Incomplete), *W* (Authorized Withdrawal), or *Z* (Unauthorized Withdrawal) may be assigned are described in the University Regulations.

The grade of *I* must be changed by a date agreed on by the instructor and the student but no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of *I* is assigned. An Incomplete that is not changed within the period automatically becomes an *F*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the director of graduate student advising for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of *I* cannot be changed by reregistering for the course here or by taking an equivalent elsewhere, and remains on the student's permanent record even after the course has been successfully completed.

Thesis

Students contemplating doctoral study are strongly urged to include the thesis as an elective in their master's program. The thesis subject should be selected as early as possible to permit effective integration with the course work.

The subject must be approved by the professor in charge of the student's field. The thesis in its final form must have the approval of the professor in charge and must be presented to the dean by the student no later than the date announced in the calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the semesters in which registered for thesis seminar (299) and/or thesis research (300), to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time is granted. The student must, however, be enrolled continuously in the program. If the preparation of the thesis extends more than three semesters beyond the date registered for thesis research, the student must register for the entire required hours of thesis again and pay additional tuition.

Master of Accountancy

The Master of Accountancy is a flexible degree program that allows students to tailor their program of study to a specific career objective. Students choose from a wide range of courses and may focus their course work in controllership, financial statement analysis, or taxation.

The program consists of 40 credit hours, including Accy 201/MBAd 210, Accy 202 MBAd 211, and MBAd 250 (with approval, a higher level course in the same content area may be substituted for each course), and Econ 219 and MBAd 220, both of which may be waived on the basis of approved prior course work. The remainder of the program consists of a choice of nine approved graduate-level SBPM courses (27 credit hours), with a minimum of five courses in accounting, taxation, or business law.

Students who intend to take the C.P.A. examination should be aware that the course work required for admission to the examination varies from state to state. Students are advised to consult the Board of Accountancy for the state in which they plan to take the examination and choose electives that meet that state's requirements.

Master of Business Administration

The Master of Business Administration is designed to prepare students for careers in management and leadership positions in both the private and public sector. Students acquire a comprehensive foundation in the fundamentals of business, the global environment in which they will function, and the analytical tools for intelligent decision making. They also develop expertise in a specific field of concentration or through an individualized field designed in consultation with and approved by the director of the M.B.A. program. The student's concentration is complemented by a set of elective courses providing broad exposure to subjects and issues at the general management level or from other related program areas.

The Master of Business Administration program comprises 60 credits and additional required noncredit workshops in basic skills for managers. Waivers of 9 to 21 credits may be granted toward the completion of core course requirements, reducing the program to the minimum residency of 39 credit hours.

The program consists of four components.

1. *Basic Skills for Managers*—All M.B.A. students must satisfy the program's basic skills requirements in finite mathematics and calculus for managers through required workshop attendance and/or proficiency examination prior to

the first semester of study. The nonwaivable workshops in communications for managers and team building and self-assessment must also be completed before the start of the first semester of enrollment.

2. *Core Courses* (30 credits)—Econ 219; MBAd 201, 202, 210, 211, 220, 221, 230, 231, 240, 250, 260. Please refer to the Courses of Instruction section of this Bulletin for core course descriptions. MBAd 270 must be taken in the first semester immediately following the completion of core course requirements. All of these courses, except MBAd 201, 202, 221, and 260, may be satisfied by evidence of successful completion of comparable work at other accredited institutions or by proficiency examination. Core courses may not be taken to satisfy either field of concentration or elective requirements.

3. *Capstone Course* (3 credits)—MBAd 270, Strategy Formulation and Implementation, may not be waived.

4. *Concentration Courses* (12 credits)—These courses give students depth of understanding in a selected field. Courses are selected in consultation with faculty advisors and program coordinators and may be tailored to individual interests.

5. *Elective Courses* (15 credits)—Students may select any graduate-level courses to satisfy this requirement after consultation and approval of faculty advisors and program coordinators. Electives can include no more than one course in the student's selected field of concentration and must include one course with a global focus related to the field.

Fields of Concentration

Students select a minimum of 12 credit hours from one of the following fields. In addition, students may design their own field in consultation with and as approved by the director of the M.B.A. program.

Accountancy—This field is designed for students who, although they are not seeking professional certification as a CPA, wish to enhance their financial skills. The field prepares students for careers in banking, financial management of public and private organizations, investment analysis, and accounting information systems. Students may focus on financial statement analysis, controllership, or taxation.

Finance and Investments—This field prepares students for careers in finance and investments, providing a background in business budgeting, controllership, treasury, long-range planning, reporting, and financial management processes. Courses are designed to emphasize the planning, analysis, implementation, and controls necessary for making effective financial decisions. Instruction not only applies to manufacturing and trading enterprise but, in addition, includes preparation for careers in financial institutions and various financially oriented government careers.

Health Services Administration—This field provides specialized courses in acute and ambulatory care and in long-term care. Acute and ambulatory care explores the organization and interrelationships of clinical and support functions for short-term inpatient service or service to those who do not require the constant supervision associated with inpatient care. Long-term care explores the administration of [illegible] and support services for those who cannot function independently. Courses in this field are offered by the Department of Health Services Management and Policy, School of Public Health and Health Services.

Human Resources Management—This field is concerned with all aspects of employment of human resources in business and public-sector organizations, both domestic and international. Career opportunities are open in domestic and international business organizations, hospitals, trade associations, research and educational institutions, and local, state, and federal government agencies. Courses encompass all phases of the recruitment, selection, employment, and development of people, compensation, industrial relations, unionism, [illegible]

tive bargaining, labor relations, leadership, and manpower utilization. Courses in this field are offered by the Department of Management Science.

Information Systems Management—This field is concerned with issues related to modern information and decision support systems in private and governmental organizations. Areas include systems analysis, user–system psychology, and trends in information systems. The program is designed for the professionals responsible for analyzing the information system needs of an organization in terms of both analyzing these needs and developing an implementation plan for information flow. Courses in this field are offered by the Department of Management Science.

International Business—This field is designed to prepare students for careers in international banking, international and multinational corporations, and export trading companies, for careers in the federal government and in international agencies concerned with business, industry, and finance abroad; and for the commerce option of the Foreign Commercial Service. The program is also designed to prepare international students for careers in foreign and domestic firms within their own countries and for commercial officer positions within their governments.

Logistics, Operations, and Materials Management—This field addresses issues related to management and operating skills in materials acquisition, production, quality control, distribution, maintenance, and support functions throughout the life of the organization, system, or product. The program focuses on the integration of the managerial functions associated with transactions, technology, production, and services necessary to institutional success. Each student selects a study track (procurement and contracting, physical distribution, or production/operations) in consultation with the advisor. Courses in this field are offered by the Department of Management Science.

Management Decision Making—At all organizational levels, decision making is among the most important and most difficult responsibility of managers. This field prepares students for management careers in both private and public sectors. The program provides a foundation in the functional areas of business, the environment in which it operates, and the analytical and computer tools essential for decision making in today's complex environment. Courses emphasize effective evaluation and integration of qualitative as well as quantitative considerations in decision making. Courses in this field are offered by the Department of Management Science.

Management of Science, Technology, and Innovation—This field is designed for managers in firms active in international technology markets and other technical scientific organizations. Program objectives are to promote more effective management by technologists and scientists and to increase non-technical managers' understanding of the role of technology and science in achieving competitive advantage and corporate renewal. The field focuses on the innovation process—setting strategy for development of technical products and services, managing creative professionals, adopting new technology in operations, and mastering the resultant organizational change. The emphasis is on fundamental principles of management applicable to all professional disciplines and industries. Courses in this field are offered by the Department of Management Science.

Marketing—This field is concerned with the development of professional marketing managers whose responsibilities may include planning and developing new products, services, and ideas; advertising, selling, and merchandising; and arranging distribution channel systems. Courses cover all aspects of the marketing management function. Specialized elective courses utilize the resources of the Washington metropolitan area.

Organizational Behavior and Development—This field is based on the application of theory and research in behavioral science to the task of building effective organizations. The program helps meet the need for professionals capable of designing, creating, and developing the necessary organizational systems appropriate to rapidly changing societies. Emphasis is on the interrelationships of motivation, leadership, problem solving, growth, and increased complexity of modern organizations and their effect upon the functions of organizational development. Courses in this field are offered by the Department of Management Science.

Real Estate and Urban Development—This field is designed to provide interdisciplinary and applied studies for students preparing for a career in real estate development. The field combines the fundamental economic principles and concepts that govern the real estate investment and development process with those that emphasize the analysis of specific projects, including site requirements and physical relationships, holding capacity, market conditions, financial feasibility and requirements, legal framework and constraints, and opportunities associated with the public sector and long-term community needs. Courses in this field are offered by the Department of Finance.

Small Business/Entrepreneurship—This field is designed to prepare students for careers in small and medium-size businesses and in entrepreneurial ventures. The concentration has been designed to permit the student to customize his or her program. Emphasis is on practical experience by consulting with local business. Courses cover all aspects of the field: small business management, technological entrepreneurship and innovation, consultative processes in organizations, emerging technologies, entrepreneurship, new venture initiation, buyer behavior, and marketing research.

Strategic Management and Public Policy—This field is directed toward understanding and analyzing the principal forces shaping the total business environment. Special attention is given to governmental policies and programs, social and cultural change, and the structure, evolution, and fluctuations of the economy. Students in this field take courses that survey the social, legal, ethical, political, and economic environment of business and the micro- and macroeconomic foundations of government policies and of business responses to these policies.

Tourism and Hospitality Management—This field is directed toward understanding and analyzing forces shaping the tourism and hospitality industry worldwide. The program of study is designed to prepare students for management roles in government, nonprofit organizations, or commercial enterprises providing visitor services at local, state/provincial, regional, national, and international destination levels, marketing services for tourism destinations or travel products, or sponsorship or operation of events (such as conferences and meetings, exhibitions, festivals) or sport activities, competitions, or facility management.

Master of Public Administration

The Master of Public Administration degree program prepares students for professional careers not only in the public service (federal, state, and local) but also in organizations that require a knowledge of public policy and administration, such as public interest groups and research institutes. The 40-credit-hour program, outlined below, is intended to provide both a generic core for all students and fields of concentration tailored to the interests and career objectives of the individual student. The curriculum provides graduate instruction in accordance with recommended by the Guidelines and Standards for Professional Master's Degree Programs issued by the National Association of Schools of Public Affairs and Administration.

All students are required to complete an eight-course (25-credit-hour) core, which includes courses in public administration and management, public expenditure analysis, public policy, organization theory, human behavior in organizations, and research methods; at the end of the program, students are required to take PAd 209, which serves to integrate the diverse perspectives in public administration. Each student selects, in addition, a field of concentration, which generally requires a four-course sequence. With the approval of a faculty advisor, the student may design a special field if none of the fields offered matches individual learning and career objectives.

The remainder of the program consists of two elective courses chosen by the student with the advisor's approval. The electives may be taken in any related program or discipline. Because public service requires a wide variety of expertise, students with all undergraduate degree backgrounds are considered for admission. There are no specific course prerequisites.

Required Courses

Core Courses—PAd 201, 202, 203, 204, 205, 206, 207, 209
Field of Concentration—four courses (9 credit hours)
Two Elective Courses (6 credit hours)

Fields of Concentration

The fields of concentration offered within the Department of Public Administration are described below. Four courses are required for each field. In addition to the fields listed below, students may elect such other standard four-course fields as Strategic Management and Public Policy, Organizational Behavior and Development, Information Systems Management, International Business, Health Services Administration and Management Decision Making. Moreover, a special field may be constructed, tailored to the student's academic interests and career objectives. To take a special field, the student writes a brief justification, specifying the courses to be taken, and submits it by petition through the faculty advisor.

Budget and Public Finance—This field covers the processes and institutions involved in budgeting, including the practical requirements of financial management; addresses issues of intergovernmental finance in a federal system; and imparts knowledge of alternative methods for allocating scarce public resources.

Federal Policy, Politics, and Management—This field offers students the opportunity to develop an expertise in the management of federal government. With focus on the practical functions of public management, the field addresses the workings of the executive and legislative branches, emphasizing the regulatory process, the civil service, international competitiveness, and congressional oversight.

Managing in Public Organizations—This field gives primary attention to the managerial processes by which organizations are structured and their work undertaken. It includes courses in organizational theory and large organizations but is also concerned with the management of governmental activities.

Managing State and Local Governments—This field deals with a range of federal, state, and local problems and issues, including alternative governmental structures and assignments of functions, sources of revenues and expenditure patterns, intergovernmental relations and management concerns, local government financing, and the formulation and analysis of urban policies.

Policy Analysis and Evaluation—The policy field is designed for those who wish to focus on the processes of public decision making and develop abilities to analyze and evaluate those processes.

Master of Science in Finance

The Master of Science in Finance degree is designed to prepare students with specific career interests in the areas of financial management and research. The program of study leading to the Master of Science in Finance emphasizes the theoretical foundations of finance and quantitative methods in financial management. Students will be engaged in applied research and modeling using a variety of data sets and computer software packages. The curriculum provides in-depth study of the international and federal government regulatory dimensions of finance.

The Master of Science in Finance program consists of 48 credit hours of course work: Fina 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282. In addition, 6 credit hours each in calculus and economics and 3 credit hours each in financial accounting, managerial finance, and statistics are prerequisite.

The Master of Science in Finance is designed to be completed in either 12 months of full-time study including a summer session or 24 months of part-time study including two summer sessions. Students with very strong backgrounds in a particular subject area can petition to waive a required course to be replaced by an elective as approved by the program director.

Master of Science in Information Systems Technology

The Master of Science in Information Systems Technology is designed to provide students depth of understanding in a selected major field. The program offers four major fields: information systems development, information systems project management, management information systems, and business technologies. Students have the option of combining two of these major fields within the program. In addition to the fields listed here, the Executive Master of Science in Information Systems Technology is offered on the Virginia Campus (see the Virginia Campus section under Courses of Instruction for more details).

Applicants with deficiencies in preparation may be required to take prescribed background courses, remedial workshops, or other forms of preparation before beginning course work in the program. Although scores are not required, applicants who have not previously demonstrated strong academic performance in a related field are encouraged to submit GRE or GMAT examination scores as additional evidence of their capability to perform competitively at the graduate level.

The program consists of 30 to 33 credit hours of graduate course work.

(a) Information systems development—Mgt 280, 282, 283, 284, 285, 286, 287; technical elective chosen from other M.S.I.S.T. courses, and two 3-credit electives.

(b) Information systems project management—Mgt 210, 215, 224, 230, 280, 282, 284, 287, a techical elective such as Mgt 243, 249, 288, or other course specified by the advisor, and Mgt 298.

(c) Management information systems—Mgt 201, 226, 231, 271, 280, 282, 286, 287; and two 3-credit electives chosen from Mgt 220, 224, 241, 272, and 288.

(d) Business technologies—Mgt 249, 279, 281, 282, 283, 284, 285, 287, and two Special Topics courses.

Fields of Concentration

Information Systems Development—This field provides thorough preparation for a career in the application of computers to the complex data and information problems found in organizations today. The program emphasizes theoretical understanding of contemporary design and implementation approaches within the development of computer-based systems.

Information Systems Project Management—This field provides a preparation for managing information systems projects by providing a solid technical foundation in information systems coupled with course work covering a variety

areas of project management. The combination of technology, organizational behavior, project and organization management, and decision support technologies presented in an information systems project context provides a thorough preparation for a career in information systems project management.

Management Information Systems—This field prepares students to design and use computer-based information systems with an understanding of the use of these systems for managing organizational information resources and supporting management decisions.

Business Technologies—This field focuses on new technologies such as the Web, relational databases, hypermedia/multimedia, virtual reality, 3D computing, groupware and videoconferencing, intelligent agents, wireless technologies, and telecommunications. All classes are held in an advanced information systems facility.

Master of Science in Professional Accounting

The Master of Science in Professional Accounting is an intensive program for those seeking accounting training for entry-level positions. After completion of prerequisites, the program may be completed in ten months of full-time study by the student willing to carry a heavy course load; the program may also be pursued on a part-time basis.

Required: 30 credit hours, plus prerequisites (5 credit hours of MBAd 220 and Econ 219), consisting of Accy 202, 203, 211, 225, 261, and 275, along with a choice of four approved graduate-level SBPM courses in accounting, taxation, finance or business law (the program allows a maximum of two courses in finance).

Students who intend to take the C.P.A. examination should be aware that the course work required for admission to the examination varies from state to state. Students are advised to consult the Board of Accountancy for the state in which they plan to take the examination and choose electives that meet that state's requirements.

Master of Science in Project Management

The Master of Science in Project Management degree program offers a set of core courses that provide a foundation in the fundamentals of management analysis and strategy. In addition, students choose one of two fields of concentration—project management or program management. The project management concentration focuses on traditional and modern techniques of managing projects that are of a specified duration, constituting projects in areas as diverse as new product development, marketing, information systems, banking, construction, accounting and financial systems, real estate development, and mergers and acquisitions. The program management concentration provides students with management concepts for large, complex programs and systems, such as national defense/weapons and space/telecommunications system development, city redevelopment, or education system modernization programs. Each concentration can include an international focus.

The program consists of 36 credit hours of graduate course work. Up to 9 credit hours of previous graduate-level course work may be considered for advanced standing on a case-by-case basis. It is recommended that applicants submit scores from the GRE or GMAT examinations, although this is not required.

Core Courses—Accy 201; Mgt 202, 234, 250; MBAd 221, and either MBAd 250 or PAd 253.

Field of Concentration Courses—

Project Management: Mgt 215, 224, 230, 231, 267, 268, 270

Program Management: Accy 202; Mgt 231, 237, 238, 253, 269, 270

Master of Taxation

The Master of Taxation degree is designed to prepare students for careers as tax professionals in public accounting, private industry, and government. The program of study provides a thorough understanding of the tax laws and their application.

The program consists of 46 credit hours of course work, of which 16 hours of first-level courses may be waived if comparable study has been completed prior to admission or by special departmental examination. Six credit hours of the minimum program of 30 hours of course work may be awarded as advanced standing.

The program of study consists of two levels.

First Level—Accy 201 or MBAd 210, Accy 202 or MBAd 211, Accy 211; Econ 219; MBAd 220, 250. First-level courses may not be taken to satisfy second-level requirements or electives.

Second Level

1. *Required Courses:* Accy 261, 262, 263, 264, 265, 269.

2. *Electives:* Four graduate-level SBPM courses are selected in consultation with the designated faculty advisor. With advisor approval, National Law Center courses or graduate-level economics courses may be substituted for SBPM courses.

Students who intend to take the C.P.A. examination should be aware that the course work required for admission to the examination varies from state to state. Students are advised to consult the Board of Accountancy for the state in which they plan to take the examination and choose electives that meet that state's requirements.

Master of Tourism Administration

The Master of Tourism Administration degree is an internationally oriented program focused on the professional and research aspects of the tourism and hospitality field. It places priority on preparation for career entry and mid-level management positions in public and non-profit organizations or commercial enterprises providing visitor services at local, state/provincial, regional, national, and international levels: integrated marketing of tourism destinations, products, and services; or sponsorship or operation of events, such as conferences and meetings, expositions, festivals, hallmark sport activities, and competitions. Students may also develop individualized study plans based upon clearly defined career requirements that utilize the resources of GW's International Institute for Tourism Studies, the University, and the Washington metropolitan area. Examples of individualized programs include hospitality management, ecotourism, aviation, and heritage tourism.

The program consists of 36 credit hours of course work consisting of four core courses (TStd 249, 250, 270, and PAd 296 or equivalent), six courses in the field of concentration as outlined below, and two capstone courses (either TStd 295 and 297 or TStd 299 and 300).

Destination Management: TStd 260, 261, 262, 263, and two electives.

Travel Marketing: TStd 230, 263; MBAd 230 or Mktg 246; IBus 266; and two electives.

Event Management: TStd 263, 277, 278, 296, and two electives.

Sport Management: TStd 264, 265, 277; Mgt 292; and two electives.

Individualized Studies: The student designs a plan of study and provides a brief justification specifying the courses to be taken, and submits it by petition through the faculty advisor.

Doctoral Program

The degree of Doctor of Philosophy is offered in accountancy, business administration, health services administration, information and decision systems, management and organization, and public administration. The Committee on Doctoral Studies supervises all aspects of the program.

Admission

The minimum admission requirement is a bachelor's degree from a regionally accredited college or university, preferably with a major appropriate to the proposed field of study. Most applicants have completed a master's degree in an appropriate field. Applicants whose degrees are in fields other than their proposed field of study are expected to obtain the necessary background either before or soon after admission to the program. Scores on the Graduate Record Examination or the Graduate Management Admission Test are required. Scores may not be more than five years old. Arrangements to take the tests must be made with the Educational Testing Service. Students whose native language is not English must also submit the Test of English as a Foreign Language (TOEFL) scores with a total score of not less than 600.

The Doctoral Committee does not use specific cutoff points for grade averages and test scores. It carefully reviews each applicant's entire record and makes its selection on a competitive basis in keeping with enrollment limitations.

Plan of Study

The doctoral program consists of two major parts: the pre-dissertation stage and the dissertation stage. The objective of the pre-dissertation stage is to provide the student with the theoretical foundations and practices of the primary and supporting fields of study and with a command of the relevant qualitative or quantitative methods of research and analysis. The objective of the dissertation stage is to have the student apply the obtained theoretical and practical knowledge and analytical methods to the resolution of a research problem. The research should be original and is expected to result in a contribution, either applied or theoretical, to the existing body of knowledge.

All course work, other educational activities, and required comprehensive evaluations in primary and supporting fields must be completed within five years of matriculation. The total program must be finished in seven years. If a student is granted an extension beyond the seventh year (14 semesters), the student must register and pay for 3 credit hours of Dissertation Research at the then-current tuition rate every semester until graduation.

The pre-dissertation stage is based on an individual study plan developed by the student under the guidance of the primary and supporting field advisors during the first academic year. In the study plan the student must state long-range professional objectives, all proposed academic activities, methods of evaluation, and a semester-by-semester schedule.

All students, regardless of the primary field of study, must include in their study plan Mgt 390, *Philosophical Foundations of Administrative Research*, and the multidepartmental course 311, *Seminar: Public–Private Sector Institutions and Relationships*. These courses must be taken during the first academic year after admission. PAd 295, Research Methods, must be taken within the first two academic years. Mgt 391, Advanced Problems of Research Methodology, must be taken at the end of course work.

In addition to the evaluation methods proposed in the study plan, a comprehensive evaluation of study plan activities for both the primary and supporting fields is the final process of the pre-dissertation stage.

As background, a student whose field is designated as Business Administration must demonstrate, either through prior academic experience or through the

proposed content of the doctoral study plan, a working knowledge of the principal content areas of business administration.

Supporting fields may be chosen from other departments of the University. A student selecting a field outside of the School, however, must meet the academic and administrative requirements of the department involved.

For more detailed information on the program and its administration, see the Handbook on the Doctoral Program, available in the Doctoral Program Office.

Special Programs

Accelerated Master of Business Administration

The Accelerated Master of Business Administration program is an intense two-year program designed for fully employed, mid-level managers with at least three to five years of professional experience. A cohort of 30 to 40 students is selected (fall and spring semester) and continues through the first year of the program together as team members. In addition to the M.B.A. core courses, the curriculum includes breadth courses and allows students to select a field of concentration or individualize a concentration. The intense format of 9 to 12 credits per semester includes weekend residencies during the first and second semesters and classes meeting one evening a week and Saturday mornings for six consecutive semesters. The Accelerated M.B.A. is offered at GW's Alexandria Graduate Center in Virginia and at the Professional Education Center near the main campus.

Executive Master of Business Administration

The Executive Master of Business Administration program is specifically designed to meet the needs of middle- and senior-level executives without career interruption. The carefully tailored curriculum emphasizes a general management approach with all the rigor and academic quality of a traditional M.B.A. degree. This 21-month program is highlighted by three week-long residencies and a two-week international study session held abroad. Approximately 35 participants move through the entire course of study as a cohort group, taking all classes together. (See the Virginia Campus section under Courses of Instruction for more details.)

Executive Master of Science in Information Systems Technology

The 15-month Executive Master of Science in Information Systems Technology is a weekend-oriented program for participants representing a broad spectrum of public and private organizations. The program equips participants with the tools necessary to manage the diverse processes of the development and application of information technology to effectively meet the needs of the modern organization. A cohort of 15 to 20 participants begins the program each September. (See the Virginia Campus section under Courses of Instruction for more details.)

Joint Degree Programs

Students may work concurrently toward both the Juris Doctor degree in the Law School and the Master of Business Administration and Master of Public Administration, in the School of Business and Public Management. In consultation with their designated faculty advisor, students in these programs may transfer up to 14 credits of Law School course work to their SBPM program and 12 credits of SBPM course work to fulfill requirements for the Juris Doctor degree. Students must be admitted separately both to the Law School and to the School of Business and Public Management and must meet all requirements in each [illegible]

gree program prior to receiving either diploma. It is possible for a student to complete work for both degree programs within four years.

In addition, a joint degree program is available through the School of Business and Public Management and the Elliott School of International Affairs. The joint Master of Business Administration and Master of Arts is offered only to students who plan to pursue a field of study in international business. The program consists of a minimum of 63 credit hours of course work. Students must be admitted separately both to the School of Business and Public Management and to the Elliott School of International Affairs and must meet all requirements for each program prior to receiving either diploma.

Post-M.B.A. Certificate Program

The Post-M.B.A. Certificate Program is designed to provide GW M.B.A. alumni an opportunity to build upon their previous graduate study to keep pace with today's business climate. Program participants may undertake a program of study in an existing M.B.A. field of concentration or from a series of specially designed program offerings. Further information is available from the Office of Graduate Admissions.

GRADUATE SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

Dean M.H. Futrell
Associate Deans J.C. Heddesheimer, R.N. Ianacone

Introduction

The Graduate School of Education and Human Development prepares teachers, human service personnel, resource and support personnel, and administrators for professional service. The School also offers opportunities to experienced professionals to extend and enrich their education. The programs are designed to meet the broad needs of persons who seek knowledge and skills necessary to provide effective learning and teaching, research, services, and leadership in a variety of settings that cover the entire life span.

The Graduate School of Education and Human Development is the administrative unit for three departments: Counseling/Human and Organizational Studies, Educational Leadership, and Teacher Preparation and Special Education. In addition to programs of study leading to its degrees, the School offers credit and noncredit workshops designed to meet the unique needs of metropolitan area school systems and other clientele in industry and government.

Special curricula are individually tailored for liberal arts graduates and graduates of other professional schools who are interested in teaching or in other human services areas. The School also offers a wide range of courses for teachers who wish to pursue advanced studies and additional endorsements and for provisional teachers who wish to prepare for teaching certificates.

Laboratory and clinical facilities are provided by the Counseling Laboratory, Community Counseling Service, and Office of Laboratory Experiences, which is responsible for internship placements in the community. Field experiences are provided in cooperation with public and private schools, social and health agencies, museums, institutions in the business community, community and junior colleges, and the federal government. Some programs and courses are also offered at off-campus locations or via distance learning.

Teacher Certification Preparation Programs

Programs are available to prepare students for teacher certification in elementary, secondary, and special education through the Master of Arts in Education and Human Development, Master of Education, and Education Specialist degree programs. Students who plan to prepare for certification must apply to the appropriate degree program. These degree programs are also available to certified teachers seeking second endorsements.

Regulations

See Fees and Financial Regulations; University Regulations.

Grades

For graduate work, grades are indicated as *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *IPG*, In Progress; *W*, Authorized Withdrawal; *Z*, Unauthorized Withdrawal; *CR*, Credit. Other grades that may be assigned are *A−*, *B+*, *B−*, *C+*, and *C−*.

Whenever a grade has not been assigned, the symbols *I* (Incomplete) or the *W* (Authorized Withdrawal) will be recorded. The *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. An instructor recording a grade of *I* will normally stipulate a date by which work must be completed. The instructor has the responsibility for changing the grade of *I* to an appropriate grade upon completion of work or, if work is not completed by the stipulated date, determining whether the grade of *I* should be changed to *F* or allowed to remain in the record. The grade of *I* remains on the student's record along with the completed grade.

PRAXIS Teacher Assessments

All degree programs preparing students for teacher certification require completion of the Educational Testing Service PRAXIS teacher assessments as specified by the District of Columbia Teacher Certification Office.

International Students

In addition to all listed criteria for admissions, students from countries where English is not an official language are required to take the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 550 is required for consideration for admission. All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on the TOEFL will be exempted from this requirement.

Depending on the test results, the student may be restricted in the number and type of courses that can be taken. Students assigned English as a Foreign Language (EFL) courses should anticipate additional related tuition expenses as well as a possible extended period of time required to complete their degree program.

The Degree of Master of Arts in Teaching in the Field of Museum Education

The Graduate School of Education and Human Development offers an interdisciplinary program in museum education. The program is designed to prepare graduates for work fulfilling the educational mission of art, history, science museums, zoos, aquaria, or nature centers; and historical societies and sites. Graduates also qualify to serve as liaison persons between schools and museums and as professionals in museum-related private and public agencies.

Those interested in museum studies more generally should refer to Museum Studies under Courses of Instruction.

Admission Requirements

To be admitted to the program in museum education an applicant must have a bachelor's degree from an accredited institution, present two written references attesting to quality of academic record and work experience; submit scores on either the Graduate Record Examination or the Miller Analogies Test; submit transcripts from each institution attended; and be interviewed by the Selection Committee or make alternative arrangements specified by the Committee. Skills in communication, a desire to study and learn from museum collections, and an ability to work with people are essential. Evidence of strong undergraduate, graduate, or professional experience in such fields as American studies, anthropology, art history, fine arts, history, or the biological, physical, or social sciences is desirable.

Plan of Study

All degree candidates take five sequential core courses in three successive semesters beginning in June and ending in May of the following year. Each student also pursues four elective courses in a chosen museum-related academic discipline and/or museology. Two carefully supervised field placements provide direct museum education experience. In the fall semester, students serve two days a week as museum resource specialists in an educational site. In the spring semester, students hold four-day-a-week internships in a museum or museum-related organization. The program requires completion of 33 credit hours.

The Degree of Master of Education

Elementary Education—The Master of Education in the field of elementary education is designed for those with an undergraduate degree in the arts and sciences. The 39-credit-hour program includes course work for students who wish to become eligible for certification for teaching at the elementary school level (grades 1–6); additional course work in content areas may be needed to meet specific jurisdictional requirements for certification.

Secondary Education—The Master of Education in the field of secondary education is designed for those with an undergraduate degree in the arts and sciences. Students are expected to have had substantial course work in an academic field taught in secondary schools. Degree candidates may specialize in art, English, English as a second language, foreign languages, mathematics, science, or social studies. The minimum 36-credit-hour program includes the course work leading to eligibility for teacher certification; specific course work in the subject area to be taught may be needed to meet jurisdictional requirements for certification.

The Degree of Master of Arts in Education and Human Development

The degree programs leading to the Master of Arts in Education and Human Development are designed to provide students with specialized knowledge and skills required for advanced professional competence in a variety of educational, human development, human service, and service industry careers. Each program of study involves a combination of classroom and field-based learning experiences tailored to a professional specialty and individual student needs. Students engage in a wide range of teaching and research approaches that reflect the School's commitment to excellence in professional education.

The diversity of master's programs in the Graduate School of Education and Human Development reflects its belief that education and human development

comprise a multifaceted enterprise reaching persons of all ages in a variety of settings. These programs develop professional knowledge, skills, and attitudes that will enable graduates to foster learning, growth, and development in individuals throughout society. Depending on the program specialty, students are prepared to pursue careers in schools, universities, community-based and human service organizations, cultural and leisure institutions, and business and government settings.

Master's programs are available in the fields listed on the following pages.

Counseling—The master's programs in counseling are designed to provide three specialty concentrations and one subspecialty concentration for entry-level positions in professional counseling. Program graduates are prepared to specialize in a specific field and to work in a variety of settings in which professional counseling is offered. All counseling concentrations require the equivalent of two full years of study and provide core learning experiences that combine professional and behavioral studies with supervised laboratory, practicum, and internship experiences. Some programs have specific prerequisites in addition to the general admissions requirements. The master's programs in school counseling and community counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs. The master's program in rehabilitation counseling is accredited by the Council on Rehabilitation Education.

Students who successfully complete a graduate program in counseling are eligible to apply for certification by the National Board of Certified Counselors. Students who successfully complete the graduate program in rehabilitation counseling are eligible to apply for certification by the Commission on Rehabilitation Counselor Certification. State licensure and certification are available in most states, and requirements vary by state.

The core course of studies for all program concentrations includes coursework in the foundations of counseling, human behavior and development, mental health problems, testing and assessment, career development, individual and group counseling, cross-cultural counseling, and research and statistics.

Community Counseling—This 48-credit-hour program prepares graduates to enter the counseling profession in a variety of human service settings, including welfare and other social service agencies, mental health centers, penal institutions, court systems, employment centers, allied health agencies, government service agencies, community college counseling centers, employee assistance programs, and private practice.

School Counseling—This 48-credit-hour program provides professional preparation for individuals to become certified as counselors in public and private schools. The program is designed to provide students with the required knowledge and skills to provide professional counseling, assessment, consultation, and guidance services in a school setting.

Rehabilitation Counseling—This 48-credit-hour program prepares rehabilitation counselors to assist persons who are physically, mentally, emotionally, or socially disabled to assume or resume their place in society. The rehabilitation counselor works with the client to develop and implement a plan to assist in such areas as independent living, job placement, supported employment, overcoming substance abuse and other physical and social barriers to living a full and satisfying life. In an accelerated program, persons with an undergraduate degree in human services/rehabilitation services can complete this program with a minimum of 42 credit hours.

Employee Assistance Counseling—This subspecialty can be elected as part of either the community counseling or rehabilitation counseling programs. The subspecialty is designed to prepare graduates as professional counselors in employee assistance programs in business, industry, and government settings.

Curriculum and Instruction—This program prepares teachers and other educational personnel for increased responsibilities in the planning, implementation, and evaluation of curriculum and instruction.

The 36-credit-hour program includes study in curriculum development, research and evaluation of instructional practice, teacher education, work with special populations, and school policy and management. A program specialization may include advanced study in elementary education, a content area of secondary education, language and education, reading, special education, or bilingual special education. For teachers interested in developing or strengthening their academic competence, the program encourages 12 to 15 hours of course work in departments other than education. A practicum is required.

Education Policy Studies—The program in education policy studies is designed for students who wish to develop skills in the technical, political, and managerial aspects of education policy analysis. Emphasis is placed on developing both a broad understanding of the political and social environment in which education policy is formulated and the technical competence to undertake independent analysis of a policy initiative. Internships are offered in a variety of federal, state, and local agencies.

The 36-credit-hour program includes course work in the policymaking process, evaluation, and current social policies influencing education. At least 9 hours of electives must be taken in a field of specialization.

Educational Technology Leadership—This program is designed for persons who are entering or advancing in positions associated with schools, higher education, alternative educational settings, or other human service occupations in which computers and related information delivery technologies are used. The program of studies provides students with opportunities to develop the knowledge, understanding, and skills necessary to provide leadership in the rapidly changing environment of technology in education.

The 36-hour program includes required course work in the theory and practice of educational technology, including the use of computers and other instructional technology systems, technological management systems, policymaking, research methods, and leadership. Some classes are offered on interactive instructional television. Twelve hours of the program are specialization electives, which can be chosen, with the advisor's consent, from other departments in the University.

Elementary/Secondary Administration and Supervision—This program prepares students for various school-based and central office leadership positions, for supervisory positions, and for increased responsibility in teaching. The program is designed to prepare graduates for advanced levels of professional responsibility in diverse school communities and to increase their technical, conceptual, political, and leadership skills. Emphasis is on leadership and management, change, communication, organizational learning, administrative and legal issues, human relations, human resource development, general supervisory principles and responsibilities, and supervision of instruction.

The 36-credit-hour program includes courses and field experiences designed to meet administrative certification requirements in the District of Columbia, Maryland, Virginia, and some other states. Candidates must have three years of successful teaching experience.

Higher Education Administration—This program prepares students for administrative positions in institutions of higher education, associations, national and international government agencies, and business and industry. The program is designed so that a student may select a concentration in administration, teaching, or curriculum. The course of studies offers an intensive review of the history, scope, present status, and trends of higher education in the United

States in comparison to selected systems in other parts of the world. Students gain knowledge and skills related to the governance, organization, and administration of colleges and universities.

The 39-credit-hour program includes courses on higher education in the United States, administration of higher education, and the community/junior college. An internship is required.

Human Resource Development—This program is designed for persons entering or advancing in positions associated with learning in organizational settings in all sectors of society. Typical careers are in organizational development, internal and external consulting, and training and development. The program is interdisciplinary, and students are encouraged to tailor their programs to individual career needs and objectives.

The eight required courses in the 36-credit-hour program include foundations and issues of human resource development, adult learning, group dynamics, research methods, and organizational analysis. Fieldwork in cooperating Washington-area business, industry, government, and community organizations may be a part of the learning experience.

Individualized Program—This program provides the opportunity to develop an individualized curriculum that cuts across existing fields, both within the Graduate School of Education and Human Development and between the School and other schools and departments of the University and the Consortium. The program is designed to meet specific career and professional objectives of applicants who have unique needs. The flexible program structure can be tailored to prepare for new and emerging fields in education and human development.

This 36-credit-hour program is available within or across the three departments of the Graduate School of Education and Human Development. The program must contain a 12-credit-hour core curriculum consisting of courses in human development, social/historical/philosophical foundations in education, and curriculum. The remaining 24 credit hours must correspond directly to the program objectives and bear a direct relationship to each of the areas identified above. A minimum of 6 credit hours of fieldwork, or the equivalent, must be a part of the program. All work toward the degree must be specified at the time the initial program is developed.

International Education—This program is designed for persons who are entering or advancing in positions associated with training, education, adult learning, and development activities in diverse settings that require international understanding. The program provides knowledge of other countries and cultures, using the education system as a means of interpreting and translating knowledge across cultures and analysis of the formal and nonformal school systems as they reflect history, culture, development, values, contemporary concerns, and future trends.

The program, which requires a minimum of 33 credit hours, allows a selection from a variety of subspecialization areas. A minimum of 15 credit hours is required in the international education studies area. A 9-credit-hour specialty complements the major area of study and may be taken in any division of the University. Six credit hours of internship may be required for students who do not have international education related experience.

Special Education—The master's programs in special education provide core and specialty studies and field experiences designed to prepare highly competent and committed professionals for a broad range of educational and leadership roles in the field of special education and related services.

Infant Special Education—This program is designed to prepare professionals to serve the needs of infants and toddlers with, or at risk for, disabilities and their families. The course of study prepares students to perform direct ser-

and administrative, consultative, and research roles in health care, human services, and educational settings. Internships in specialization areas include hospital-based programs, infant intervention settings, developmental assessment clinics, research facilities, day-care centers, and advocacy organizations.

The 39-credit-hour program includes courses in infant development and assessment, neurodevelopmental assessment and programming, family systems intervention, service coordination, and interdisciplinary team functioning. A practicum and internship are required.

Early Childhood Special Education—This program prepares educators in the areas of development of young children evidencing developmental delay, identification and assessment procedures, and clinical teaching and alternative models of service for children with, or at risk for, disabilities. The program prepares students for interdisciplinary work with children from ages three to eight.

The 39-credit-hour program includes courses in language development, typical and atypical development, formal assessment, interdisciplinary theory, family intervention skills, behavior management, and legal and policy concerns. A practicum and internship are required.

Special Education for Children with Serious Emotional Disturbance—This 39-credit-hour program of study requires a two-semester clinical internship at an elementary and middle school serving children with serious emotional disturbance. Students are involved in course work and clinical experiences with professionals from various allied mental health fields. The program is designed to develop competencies in the nature and needs of children with serious emotional disturbance; assessment, programming, and teaching; and working effectively as an interdisciplinary and interagency team member. The program is available to full-time students only and can be completed in one calendar year.

Special Education for Adolescents with Serious Emotional Disturbance—This part-time, 42-credit-hour program of study typically requires two academic years and three summers to complete. The program is multidisciplinary in concept and design. Students are involved in course work and clinical experiences with professionals from various allied mental health fields. The multidisciplinary program is designed to develop competencies in the nature and needs of adolescents with serious emotional disturbance; assessment, programming, and teaching; functioning effectively as an interdisciplinary team member; and providing consultation to administrators and teachers in regular education on inclusion.

Transition Special Education—This interdisciplinary program prepares educators and support personnel to address the needs of youth and young adults with special needs for careers and transition from school to postsecondary education, employment, and independent self-adjustment. Teacher certification preparation in categorical learning disabilities or noncategorical special education areas is available through the program. The curriculum integrates the roles of relevant disciplines and service agencies, including postsecondary planning, alternative service models, and extended career support and adjustment to independent living. The program requires 39 credit hours of graduate course work, practicum, and field-based professional practice and research. Students can plan their programs to emphasize secondary and career programming, learning disabilities, collaborative vocational evaluation, traumatic brain injury, corrections, and business–education partnerships.

Admission Requirements for the Master of Arts in Education and Human Development

The Graduate School of Education and Human Development seeks applicants with strong academic potential, high motivation, and aptitude to do graduate-level work. Admission decisions are based on an evaluation of all material submitted in support of the application. The School requires official transcripts of

all previous undergraduate and graduate course work and acceptable test scores on either the Graduate Record Examination or the Miller Analogies Test.

Two letters of recommendation and a statement of purpose are required. Most programs also require an interview with program faculty. The interview may be waived with permission of the coordinator of the desired program for those living outside the Washington metropolitan area.

In addition to these basic requirements, individual programs may require relevant professional experience and other supporting documentation before a final decision on admission is made. Upon receipt of the application to the individual program, information on specific requirements will be sent to the applicant. The personal interview, professional experience, and supporting references provide important qualitative evidence concerning an applicant's academic potential and professional background.

The admission review is based upon a comparison of qualifications among all applicants, weighing both the School's general admissions criteria and program-specific criteria.

Positive decisions are made quickly for applicants who present uniformly strong application credentials in all areas. In some cases, unusually strong factors will offset comparatively weak factors and result in an offer of admission to provisional status in the School. For a student to be admitted to full candidacy from provisional status, he or she must earn grades of *B* or better in the first 9 credit hours of course work. Grades of *I* are not acceptable.

Advanced Standing

Advanced standing is granted for approved courses taken at other accredited institutions, but a minimum of 24 credit hours must be completed in the Graduate School of Education and Human Development as a master's candidate. A maximum of 12 credit hours taken in nondegree status may be credited toward the master's degree.

Advanced standing is not granted for work completed five or more years before application for admission or readmission to master's candidacy. All work accepted for advanced standing must have been earned with a grade of *B* or better and must be approved for acceptance by both the advisor and the dean. *Credit, Satisfactory, Audit,* or other nonletter grades are not acceptable.

Plan of Study

The plan of study leading to the degree of Master of Arts in Education and Human Development requires a minimum of 33 hours of graduate credit. Several programs have additional credit hour requirements. The plan may, at the student's option, include a thesis carrying six hours of graduate credit. Whether or not a student selects the thesis option, a minimum of 18 hours must be in courses planned primarily for graduate students (third-group courses). A minimum of 12 hours, not including the thesis, must be from courses offered by the Graduate School of Education and Human Development.

Programs are initially reviewed in conference with an admissions advisor in the School and subsequently finalized with a designated advisor in the candidate's area of specialization. Programs are based on a candidate's interests and background, those related to teaching in public schools are designed around certification requirements of the state and locality in which the candidate plans to teach.

All degree requirements must be completed within six years, whether study is full time or part time. An additional (or seventh) year is allowed in the case of a student who breaks enrollment and is subsequently readmitted.

Continuous Enrollment and Residence

Students must be continuously enrolled in the Graduate School of Education and Human Development unless the dean grants a leave of absence. Failure to register each semester of the academic year will result in lapse of candidacy. Subsequent readmission is subject to whatever new conditions and regulations have been established by the School.

Students who are graduating, requesting grade changes from that of Incomplete, or taking the comprehensive examination must be registered for at least 1 credit hour during the semester in which these activities take place. Continuous enrollment or leave of absence status is not acceptable in these circumstances. Students may, however, choose to wait for a semester in which they are actively registered for courses to finish Incompletes. It is necessary to register for the summer sessions only if the student is applying to graduate during the summer.

Scholarship

A grade-point average of 3.0 is required for graduation. Students who receive a grade of *C* in more than 6 credit hours are subject to suspension. Students who receive a grade of *F* must confer with the dean before enrollment for further work.

The Thesis

Students may elect a thesis option. The choice of the thesis subject must be approved in writing by the student's advisor and filed in the office of the dean. A statement of the School's standards for the thesis and printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the office of the dean.

Payment of tuition for the thesis course entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time may be granted. The student must, however, be enrolled continuously in the program. If the preparation of the thesis extends beyond the additional time granted, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

Master's Comprehensive Examination

Candidates in master's programs requiring 33 credit hours must take a comprehensive examination. Candidates in some nonteaching programs whose basic requirements exceed 36 credit hours may waive the comprehensive examination with approval of the academic advisor. Candidates who plan to take the examination must be registered for at least 1 credit hour in the semester it is to be taken and must file a written application in the Dean's Office of the Graduate School of Education and Human Development no later than 30 days prior to the date of the examination. Comprehensive examinations are required of students in Elementary/Secondary Administration and Supervision, International Education, Education Technology Leadership, and all programs in Teacher Preparation and Special Education.

Second Master's Degree

Persons seeking a second master's degree in the Graduate School of Education and Human Development must complete all core and specialization requirements and a minimum residency requirement of 24 credit hours.

The Degree of Education Specialist

The program of advanced study leading to the degree of Education Specialist is for students with master's degrees in education who seek further professional preparation for specific objectives.

The program is available in the fields of educational administration, counseling, curriculum and instruction, higher education administration, human development, human resource development, and special education.

Admissions Requirements

The following are required for entrance to an Education Specialist program: a Master of Arts in Education and Human Development or its equivalent, two years of pertinent experience in an education or human development field, and a graduate scholastic average of at least 3.3 and an acceptable score on either the Graduate Record Examination or Miller Analogies Test. Two letters of recommendation, one from a professional supervisor and one from the most recent graduate faculty advisor, are required, along with a statement of professional goals. Each applicant must be interviewed and recommended by a faculty advisor in the major field.

Scholarship

Scholarship requirements for the degree of Education Specialist are the same as those for the degree of Master of Arts in Education and Human Development (see above).

Programs of Study and Degree Requirements

Individual programs are developed, through a plan of study worked out with a faculty advisor, to fit the candidate's skills, interests, and career goals. A minimum of 30 credit hours beyond the requirements of the degree of Master of Arts in Education and Human Development is required. At least 21 hours of this work must be taken in residence at GW. A maximum of five calendar years is allowed for completion of the program.

At least 12 of the required 30 hours must be in appropriate graduate courses in education selected from the following areas: (1) foundations and cognate study, (2) background and general principles of the field of study, and (3) an area of specialization. A graduate-level research methods course must be included in the program if it was not completed in previous graduate work.

The Comprehensive Examination

Successful completion of a six-hour written examination and/or an oral examination, at the option of the major field advisor, is required. Candidates taking the examination must be registered for at least 1 credit hour in the semester in which it is to be taken and must file a written application in the dean's office at least 30 days prior to the date of the examination.

The Degree of Doctor of Education

The Graduate School of Education and Human Development offers programs of advanced study leading to the degree of Doctor of Education. These programs provide major fields of study in curriculum and instruction, special education, counseling, human development, educational administration and policy studies, human resource development, and higher education administration. Supporting fields are available in educational administration, higher education administration, counseling, curriculum and instruction, elementary education, human development, human resource development, international education, program evaluation, reading, secondary education, special education, and

vision, and teacher education. With the approval of a student's program planning committee, course work may be taken in other departments of the University and through the Consortium. All programs require study of interrelated areas of education and a doctoral dissertation in the major field of study.

All doctoral programs are designed to accommodate the needs of working professionals who must pursue their studies on a part-time basis. Required graduate courses, with few exceptions, are offered in the late afternoon and evening. In some programs, selected courses may be taken at off-campus locations.

Admission Requirements

The applicant must have adequate preparation for advanced study, including graduate work in fields prerequisite to his or her objective and comparable to that required for the degree of Master of Arts in Education and Human Development at this University. Students with a master's degree in a field other than education may be considered for doctoral study provided that the degree and previous experience are judged relevant by the major field program faculty.

For an application to be forwarded to the major field program faculty for their consideration, an applicant must have a minimum graduate scholastic average of 3.3 and a 50th percentile score on the Miller Analogies Test or Graduate Record Examination. Under certain circumstances, the associate dean may recommend to the faculty a student who does not meet the stated criteria but who has shown exceptional promise in the chosen field. Programs often set higher admission standards, and the number of spaces available for new doctoral students limits the number that can be accepted.

The applicant is strongly encouraged to schedule an interview with the director of graduate admissions, who will discuss the applicant's needs in relation to the School's resources, explain the required procedures and standards, and guide the applicant through the admission process. In addition, all applicants must have an interview with faculty members in the major field. Students receiving favorable recommendations from the major field faculty are admitted to precandidacy for the degree.

Precandidacy

In the precandidacy period a minimum of 9 credit hours of course work in the program must be completed. Full-time students must complete this work within the first 18 credit hours; part-time students must complete it within three semesters of admission to precandidacy. Application for full candidacy will then be decided on the basis of the quality of scholarship in the precandidacy period, the recommendations of instructors, a detailed plan for the balance of the program, and a qualifying examination.

Plan of Study

In general, two to three years of full-time study beyond the master's degree in education, or the equivalent in part-time study, are required. Course work and examinations must be completed within five years, and the entire program must be completed within eight years. The minimum residency requirement is 36 credit hours of course work beyond the master's degree in education, plus 12 to 24 hours of dissertation research. In most cases, course work beyond the minimum is required.

Programs are individually planned. Each program is divided into two parts. The first consists of studies preparatory to taking major and supporting field comprehensive examinations and required research tool studies. The second consists of the doctoral dissertation and the final oral examination.

Upon admission to doctoral candidacy, the student is assigned to a program planning committee of three faculty members, one of whom must be from outside the major field of study. Students who have completed the comprehensive examinations and have received committee approval of a dissertation proposal must register for 6 hours of Dissertation Research in two consecutive semesters and 3 hours per semester thereafter, until the satisfactory completion of the dissertation or the completion of 24 credit hours of dissertation research. More specific information is available in the *Doctoral Student Handbook*.

Comprehensive Examinations

No later than the end of the third semester, the student must (1) pass a three-hour qualifying examination, the content of which includes material from both the major field of study and foundations of education, or (2) satisfactorily defend a portfolio; the portfolio option is only available for students in designated cohort programs. Doctoral students who received an Ed.S. from this University, having consequently taken a comprehensive examination, are required only to take the foundations portion of the qualifying examination. All course work, including the research tool requirement, must be successfully completed prior to taking the integrative comprehensive examination (the only exception is the Pre-Dissertation Seminar). The integrative comprehensive examination is a written 12-hour examination, six hours on each of two successive days. The candidate begins the second part of the program after the satisfactory completion of all examinations and the required research tool field. Candidates taking the examination must be registered for at least 1 credit hour in the semester in which is to be taken and must file a written application in the dean's office at least 30 days prior to the date of the examination.

The Dissertation

A dissertation is required as evidence of ability to perform original scholarly research and to interpret and present its results.

At the beginning of the dissertation phase, the dean appoints a dissertation committee, consisting of a chairperson (usually a faculty member in the major field) and two additional faculty members. The candidate is required to submit a proposal for the dissertation to this committee, which determines its acceptability. The dissertation is completed under the guidance of the chairperson with the advice of the other members of the dissertation committee.

To graduate in a particular semester, the candidate must submit to the dean no later than the date specified in the calendar, four complete copies of the dissertation and an abstract and biographical sketch for inclusion in the announcement of the examination and for reproduction by University Microfilms, Inc. Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in the office of the dean. The successful candidate for the doctorate is required, before receiving the degree, to pay fees that are applied toward the expense of binding library copies of the dissertation, printing the Announcement of the Final Examination, and the basic service ordered by University Microfilms, Inc., and to sign a microfilm agreement.

The Final Examination

When the dissertation has approval of the dissertation chairman and at least one other committee member, the candidate is recommended to the dean for the final oral examination, which must be passed at least 30 days before the degree is to be conferred. The examination is open to the public and is conducted by a committee of the faculty, appointed by the dean, supplemented by at least two leaders in the candidate's field of study from outside the University. Candidates who successfully pass the oral examination are recommended for the degree.

the faculty of the Graduate School of Education and Human Development. Three final edited copies of the dissertation must be submitted to the office of the dean within one month of the final oral examination and no later than one month before the degree is to be conferred.

Continuous Study and Residence

Students must be continuously enrolled in the Graduate School of Education and Human Development, unless the dean or the Advanced Graduate Faculty grants a leave of absence. Failure to register each semester of the academic year may result in lapse of candidacy. Subsequent readmission is subject to whatever new conditions and regulations have been established by the Advanced Graduate Faculty.

Off-Campus Degree Programs

The Graduate School of Education and Human Development offers off-campus programs leading to the Master of Arts in Education and Human Development in the fields of curriculum and instruction, educational technology leadership, elementary/secondary administration and supervision, school counseling, and human resource development; the Master of Education in the field of secondary education; and the Education Specialist in the fields of educational administration and human resource development. On-campus course registration is required in some cases. The programs are administered through the Division of University Programs.

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Interim Dean T.A. Mazzuchi
Interim Associate Deans R.S. Heller, S. Sarkani

Introduction

The School of Engineering and Applied Science was organized in 1884 as the Corcoran Scientific School of Columbian University. It was named in honor of William W. Corcoran, president of the University's Board of Trustees from 1869 to 1888. The school was among the first to accept women for degree candidacy in engineering. The organization and offerings of the school have evolved over the years, but throughout most of its history the program has been characterized by its emphasis on the principles guiding the advancement of technology. The current name was adopted in 1962.

Through its four departments—Civil, Mechanical, and Environmental Engineering; Electrical Engineering and Computer Science; Engineering Management; and Operations Research—the School of Engineering and Applied Science offers graduate study leading to the degrees of Master of Science, Master of Engineering Management, and Doctor of Science and to the professional degrees of Engineer and Applied Scientist. Programs are individually planned according to the student's preparation and needs. The School also offers a graduate-level certificate program through each of its four departments.

Among the special opportunities offered by the School are research institutes established for the purpose of creating opportunities for student and faculty research, strengthening ties with counterparts in government and industry, and

contributing to the development and harnessing of emerging technology. These include the Institutes for Artificial Intelligence, Computer Graphics, MEMS and VLSI Technologies, Magnetics Research, Reliability and Risk Analysis, Materials Science, Medical Imaging and Image Analysis, and Crisis, Disaster, and Risk Management; Joint Institute for Advancement of Flight Sciences (located at the NASA–Langley Research Center in Hampton, Virginia); National Ports and Waterways Institute; National Crash Analysis Center; and Center for Structural Dynamics Research.

Admission

For specific entrance requirements, please see individual degree programs.

Transfer of Credit

With the approval of the student's advisor and department chair, graduate credit may be transferred, when applicable, to meet degree requirements of the School. For a master's or professional degree candidate, or a doctoral candidate whose highest earned degree is a master's, up to 6 credit hours may be transferred. For a doctoral candidate whose highest earned degree is a bachelor's degree, up to 24 credit hours may be transferred from another doctoral program. In no event may more than 6 transferred credit hours be applied to a master's or professional program. The credit must have been completed with grades of *A* or *B* at another accredited and recognized institution, at a level of study equivalent to that being pursued at GW. In addition, the professional and doctoral degree programs require that the credit be earned no more than five years prior to admission to the GW program, and some departments require that it be earned more recently. Credit applied toward a previous degree may not be transferred. Transfer of credit regulations apply to courses taken as a nondegree student through GW's Division of University Programs; that is, up to 6 credit hours may be taken in nondegree status before applying for admission to degree status. For purposes of transfer of credit, the SEAS certificate program is not considered a prior degree. At the discretion of the department concerned, the 18 credit hours earned in a certificate program may be applied to a subsequent degree program.

English Language Requirements for Admission of International Students

Applicants from countries where English is not an official language must take the Test of English as a Foreign Language (TOEFL). The University looks for a minimum TOEFL score of 550 in considering candidates for admission.

International students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on the TOEFL will be exempted from this requirement.

Depending on the test results, the student may be restricted in the number and type of courses that can be taken. Students assigned English as a Foreign Language (EFL) courses should anticipate additional related tuition expenses as well as possible extended periods of time required to complete their degree programs. Departments may set higher standards and should be consulted.

Regulations

See Fees and Financial Regulations; University Regulations.

Attendance

Students may not attend classes until registration is completed. They may attend only those classes for which they are registered. Students are expected to

attend all meetings of the courses in which they are registered, fully prepared to carry on the work required. Students may be dropped from any course for undue absence.

Grades

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *CR*, Credit (for satisfactory thesis completion); *I*, Incomplete; *IPG*, In Progress; *W*, Authorized Withdrawal; *Z*, Unauthorized Withdrawal. Grades of *A*−, *B*+, *B*−, *C*+, and *C*− may also be assigned.

At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond his or her control, is unable to complete the work of the course and if the instructor is informed of and approves such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented, the instructor may initiate an appropriate grade change. Although the grade of *I* may remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work must be made up. The grade of *I* cannot be removed by the student's reregistering for the course here or taking its equivalent elsewhere. An incomplete that is not removed within one calendar year or at the time of graduation of the student, whichever occurs first, is automatically changed to an *IF*. When the *I* is changed to a letter grade, the grade of *I* followed by the letter grade (e.g., *IB*) will appear on the student's record.

The symbol *Z* is assigned when a student is registered for a course that he or she has not attended and for which he or she has done no substantial graded work. The grade of *Z* will not be considered in determining the grade-point average.

Credit/No Credit Grading System—SEAS students may take SEAS courses under the credit/no credit grading system, but credit for such courses cannot be applied toward any degree program in SEAS.

Program of Study

In consultation with the academic advisor, each student develops a program of study and enters it on a form that governs the student's degree requirements and that must be approved by the advisor and department chair. The form should be established soon after matriculation and must be completed before the student is certified for graduation.

Changes in Program of Study

Adding Courses—Courses may be added during the first two weeks of classes in any semester, subject to permission of the instructor or the department involved.

Withdrawal from Courses—Students may withdraw from courses without academic penalty up to the end of the ninth week of classes in the fall and spring semesters. In unusual circumstances, if a student desires to withdraw from a course after the authorized withdrawal deadline, the student must first present documented evidence of extenuating circumstances to the department chair and then to the associate dean for academic affairs. In all cases, financial regulations governing withdrawal remain in full effect.

Changes in Course Status—The status of a course may not normally be changed from credit to audit after the end of the sixth week in the fall or spring semester.

Residence and Continuous Enrollment

All work for the degree must be done in residence unless an exception is granted by the department chair. In addition, a student in a degree program is expected to be continuously enrolled in the School until the degree is conferred. A student who breaks his or her registration must apply for readmission to the degree program under whatever conditions and regulations are in force at that time. To maintain continuous enrollment, a student may register in one of the following categories.

Leave of Absence—This status is available to students who are awaiting graduation (with all requirements completed); attending classes at another institution (with special approval); temporarily transferred out of the area (e.g., for military TDY); or having temporary medical problems.

Continuing Research—Students who have completed their research credits but are not yet ready to defend a thesis or dissertation, must register for 1 credit of Continuing Research each semester as appropriate.

Examination Preparation—Students who are studying for a comprehensive or qualifying exam for the current or following semester, and are not taking any courses, must register for 1 credit of Examination Preparation as appropriate.

Degree Programs

The following list shows the seven fields of graduate study and their areas of concentration. Requirements for the graduate degrees in the various fields are presented in subsequent pages. To obtain additional information on professional and doctoral degrees in a given field, contact the department administering the field.

Civil and Environmental Engineering
(Department of Civil, Mechanical, and Environmental Engineering)

Engineering Mechanics
Environmental Engineering
Geotechnical Engineering
Structural Engineering
Water Resources Engineering

Computer Science
(Department of Electrical Engineering and Computer Science)

Algorithms and Theory
Artificial Intelligence and Computer Vision
Computer and Communications Security
Computer Engineering and Architecture
Computer Graphics and Multimedia Systems
Industrial Engineering
Parallel and Distributed Computing
Software Engineering and Systems

Electrical Engineering
(Department of Electrical Engineering and Computer Science)

Biomedical Engineering
Communications
Controls, Systems, and Signal Processing
Electrical Power and Engineering Management
Electromagnetic Engineering
Energy Conversion, Power, and Transmission
Industrial Engineering
Microelectronics and VLSI Systems

Telecommunications and Computers
(Department of Electrical Engineering and Computer Science)

Engineering Management
(Department of Engineering Management)

Domain-Specific Engineering Management
Economics, Finance, and Cost Engineering
Electrical Power and Engineering Management
Engineering Management Principles, Practices, and Methods
Industrial Engineering
Information and Process Engineering
Systems Engineering and Quantitative Analysis

Mechanical Engineering
(Department of Civil, Mechanical, and Environmental Engineering)

Aerospace Engineering
Design of Mechanical Engineering Systems
Fluid Mechanics, Thermal Sciences, and Energy
Industrial Engineering
Solid Mechanics and Materials Science
Structures and Dynamics
Transportation Safety Engineering

Operations Research
(Department of Operations Research)

General Operations Research
Industrial and Engineering Statistics
Industrial Engineering
Management Science
Mathematical Optimization
Stochastic Modeling

Master's Degree Programs

Entrance Requirements

Admission to study toward a master's degree requires an appropriate bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, such as may be indicated by undergraduate grades, GRE scores, and similar data. (Although GRE scores are not generally required for admission to SEAS, applicants are encouraged to take the examination.) In the Department of Engineering Management, students must take the GRE and present acceptable scores unless they can demonstrate that they have had a minimum of two years of postbaccalaureate professional experience in a business firm in which English is the primary language.

General Program Requirements

The minimum program consists of 24 credit hours (27 credit hours in the Department of Engineering Management) of approved graduate courses and a master's thesis (6 credit hours). With the approval of the department, the student may elect an optional program without a thesis that consists of a minimum of 30 credit hours of approved graduate courses in the Department of Electrical Engineering and Computer Science, 33 in the Departments of Civil, Mechanical, and Environmental Engineering and Operations Research, and 36 in the Department of Engineering Management. Students whose undergraduate study does not include necessary prerequisites may be required to take additional

course work. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the master's degree.

Upon admission, the student is assigned an advisor. Programs of study are determined by established prerequisites and the requirements of the department in which the student wishes to study. The program of study must be approved by the student's advisor and the department chair. Some programs specify a required set of core courses.

Master's Thesis

The master's thesis must demonstrate the student's ability to make independent use of the knowledge and discipline of thought acquired through graduate study, to undertake constructive work in a given field, and to communicate the results of the work in writing. Suitable work for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

To register for the thesis course (299), the candidate must submit the thesis area to the appropriate department chair, on the form obtained from the department office and approved by the faculty advisor. At the beginning of the semester of expected graduation, the candidate must submit the thesis title to the dean, on the form available in the department office. While registered in the thesis course sequence 299–300, the student is entitled to the advice of the faculty member under whom the thesis is to be written. Students may consult with their advisors, but they have primary responsibility for the thesis.

The thesis in final form must be submitted to the department chair by the date stated in the calendar for the semester in which the candidate enrolls in thesis course 300. In the event a thesis is unfinished on the date specified, the student must register for continuing research. The overall time limit for earning the degree (see Time Limits, below) may not be exceeded. A thesis may be submitted in final form one time. The acceptability of the thesis is determined exclusively by the Master's Examination committee. If the thesis is unacceptable, the student's graduate status is terminated.

Copies of detailed regulations regarding the form and reproduction of the thesis are available in the department office. Accepted theses, with accompanying drawings, become the property of the University and are deposited in the Gelman Library, where the duplicate copies are bound and made available for circulation.

Scholarship Requirements

Courses specified in the student's program of study must be completed with a minimum grade-point average of 3.0 for award of a master's degree. A student who receives two grades of *F* or three grades below *B*− is barred from further enrollment in graduate courses and, ordinarily, will not be readmitted as a degree candidate. A student may not repeat for credit a course in which he or she has received a grade of *C*− or above, unless required to do so by the department chair. A written statement requiring the student to repeat such a course for credit must be submitted to the registrar by the department chair.

Time Limits

A full-time student in the master's program is allowed a maximum of three calendar years (excluding the time spent taking only English as a Foreign Language courses) to complete all degree requirements, from the date of first registration as a degree candidate in prerequisite or graduate courses. A part-time student in the master's program is allowed a maximum of five calendar years. The time limit does not include any period of registration as an unclassified student before admission to degree candidate status or any period spent on approved leave of absence. Students who do not complete degree requirements within

allowed time will have their degree candidate status terminated. They may be readmitted to degree candidate status under conditions specified by the department chair and approved by the dean.

Fields of Study

Graduate programs in the School of Engineering and Applied Science are available in the seven fields of study shown below. Each field in turn encompasses several areas of concentration that accentuate a specialized focus. The course of study responds to the unique interests of the student, who designs an individual program in close consultation with the assigned advisor. In most areas, students follow a prescribed core and elect approved courses from within the School of Engineering and Applied Science and from other schools of the University. Students must have satisfied, through undergraduate studies, the prerequisites specified, or approved equivalents.

Because engineering expertise includes a broad foundation in technology, engineering study may profitably be combined with study in other areas to sharpen the engineer's focus in practice. Students whose interests span disciplines may select from a number of joint field, single degree and joint field, dual degree programs.

Civil and Environmental Engineering

The field of Civil and Environmental Engineering is administered by the Department of Civil, Mechanical, and Environmental Engineering, which expects that the applicant's background includes an undergraduate degree in engineering, the physical sciences, or applied mathematics. A grade average of *B* for the last two years of undergraduate study will normally be required.

Because computers are integral to education and research, the ability to use computers is assumed in graduate courses.

Some areas of civil and environmental engineering leading to the Master of Science are offered at the NASA–Langley Research Center, Hampton, Virginia. NASA–Langley's extensive scientific and engineering facilities are used whenever possible.

Areas of Concentration Leading to the Master of Science

Engineering Mechanics—Required: ApSc 213; EngS 218, 285.
Environmental Engineering—Required: CE 212, 240, 284.
Geotechnical Engineering—Required: CE 205, 219; EngS 285.
Structural Engineering—Required: CE 210; EngS 215, 285.
Water Resources Engineering—Required: CE 212, 240, 284.

Computer Science

Prerequisite: CSci 51, 120, 131, 133, 140, 144, 172. Required: CSci 182, 217, 232, 258.

The field of Computer Science is administered by the Department of Electrical Engineering and Computer Science, which requires that the applicant have a grade-point average of at least 3.0 (on a scale of 4.0), or equivalent, for the last 60 credit hours of undergraduate work and be adequately prepared in the basic physical sciences (physics and either chemistry or biology) and in mathematics (four semesters beyond precalculus).

A maximum of three courses at the 100 level may be counted toward the requirements for the degree. The following undergraduate courses may be taken for graduate credit if they are included in the student's approved program of study: EE 126, 127, 128, 144, 178, 184; CSci 134, 155, 174, 178, 182, 185, 187, 190

Graduate students are required to attend several department colloquia each semester. These are intended to broaden the student's professional outlook and to encourage interaction with the faculty. Schedules are posted.

Areas of Concentration Leading to the Master of Science

Algorithms and Theory
Artificial Intelligence and Computer Vision
Computer and Communications Security
Computer Engineering and Architecture
Computer Graphics and Multimedia Systems
Parallel and Distributed Computing
Software Engineering and Systems

Electrical Engineering

The field of Electrical Engineering is administered by the Department of Electrical Engineering and Computer Science, which requires that the applicant have a degree in electrical engineering with a grade-point average of at least 3.0 (on a scale of 4.0), or equivalent, for the last 60 credit hours of undergraduate work and be adequately prepared in the basic physical sciences and in mathematics.

A maximum of three courses at the 100 level may be counted toward the requirements for the degree. The following undergraduate courses may be taken for graduate credit if they are included in the student's approved program of study: EE 126, 127, 128, 144, 178, 184; CSci 120, 131, 133, 134, 140, 144, 155, 157, 162, 174, 178, 182, 185, 187, 190.

Prerequisite: B.S.(E.E.) or B.S. in any field and EE 11, 12, 20, 31, 32; Math 31, 32, 33; ApSc 113, 114, 115; CSci 100.

Required courses are three courses selected from EE 203, 210, 211, and 2[illegible]. The remaining courses (five courses and a thesis, or seven courses) may be chosen by the student based on individual interests, subject to the approval of the student's faculty advisor.

Areas of Concentration Leading to the Master of Science

Biomedical Engineering
Communications
Controls, Systems, and Signal Processing
Electrical Power and Engineering Management
Electromagnetic Engineering
Energy Conversion, Power, and Transmission
Industrial Engineering
Microelectronics and VLSI Systems

Telecommunications and Computers

The field of Telecommunications and Computers is administered by the Department of Electrical Engineering and Computer Science, which requires that the applicant have an undergraduate degree with a grade-point average of at least 3.0 (on a scale of 4.0), or equivalent, for the last 60 credit hours of undergraduate work and be adequately prepared in the basic physical sciences and mathematics.

Prerequisite: B.S. in electrical engineering, computer science, or computer engineering, or B.S. in any field and EE 11, 12, 20, 31, 32; Math 31, 32, 33; ApSc 113, 114, 115; CSci 100.

Required courses are EE 248, 259, and 251 or 346; CSci 217. The remaining courses (four courses and a thesis, or six courses) may be chosen by the student

based on individual interests, subject to the approval of the student's faculty advisor.

Engineering Management

Prerequisite: EMgt 170; Math 52. Required: EMgt 211, 212, 254, 260, 269, 283, and 297 or, for the first two tracks in the area of information and process engineering, 296.

The field of Engineering Management is administered by the Department of Engineering Management, which requires that an applicant for the Master of Engineering Management degree have an undergraduate degree in engineering, natural science, or mathematics.

The core courses (those listed as required above through EMgt 283) for both the M.E.M. and the M.S. degree programs are required for the degree and must be taken prior to any other courses in the program.

Master's degree students must have earned a grade of *C* or better in each undergraduate prerequisite course, and in some cases a grade of *B* or better may be stipulated.

Areas of Concentration Leading to the Master of Engineering Management

Domain-Specific Engineering Management—Tracks in this area that lead to the M.E.M. degree include construction and facilities management, environmental and energy management, management of research and development, marketing of technology, public works management, and transportation management.

Engineering Management Principles, Practices, and Methods

Areas of Concentration Leading to the Master of Science

Domain-Specific Engineering Management—The track in this area that leads to the M.S. is manufacturing management.

Economics, Finance, and Cost Engineering

Electrical Power and Engineering Management (joint area)—See requirements under the Electrical Engineering field.

Information and Process Engineering—Tracks include information and software engineering, information management and information systems, intelligent systems and human–computer interaction.

Systems Engineering and Quantitative Analysis—The track in this area is systems engineering and management.

Mechanical Engineering

The field of Mechanical Engineering is administered by the Department of Mechanical and Environmental Engineering. See the Civil and Environmental Engineering field for entrance and program requirements.

Areas of Concentration Leading to the Master of Science

Aerospace Engineering—Required: ApSc 213; EngS 284; ME 221. Tracks are available in aeroacoustics, aeronautics, astronautics, propulsion, and space systems.

Design of Mechanical Engineering Systems—Required: ME 243, 251; EngS 285. Tracks include computer-aided design, computer-integrated design and manufacturing, mechanical engineering design, and robotics.

Fluid Mechanics, Thermal Sciences, and Energy—Required: ApSc 213; EngS 284; ME 221.

Solid Mechanics and Materials Science—Required: ApSc 213, EngS 241, 218, or 241.

Structures and Dynamics—Required: ApSc 213; EngS 215, 285.

Transportation Safety Engineering—Required: EngS 217, 284, 285.

Operations Research

The field of Operations Research is administered by the Department of Operations Research, which requires that the applicant's background include an undergraduate degree in engineering, the physical sciences, or the mathematical sciences. The department offers both a thesis (30 hours) and nonthesis (33 hours) option for the master's degree.

Areas of Concentration Leading to the Master of Science

General Operations Research
Mathematical Optimization
Stochastic Modeling

Prerequisite: ApSc 115, 116; CSci 100; Math 33. Required: OR 209, 216, and either 299 and 300 (thesis option) or 291 (nonthesis option). Some prerequisites may be taken concurrently with graduate courses; with the exception of ApSc 116, prerequisite courses do not fulfill any part of the requirements for the master's degree. It is required that students complete OR 209 and 216 before enrolling in other courses in the department. In certain cases, permission may be granted for concurrent registration. Students electing the nonthesis option will normally complete OR 291 in the last semester of study.

Management Science—Prerequisite: ApSc 115, Math 52. Required: OR 202, 235, 236; EMgt 281 or 283; one of EMgt 287 or Mgt 224 or Mgt 226; either OR 291 or 299–300.

Joint Master of Science in the Field of Industrial and Engineering Statistics

Prerequisite: ApSc 115 or Stat 118, Math 33, CSci 100, and knowledge of basic linear algebra. Required: OR 254, 281, 282 and Stat 201, 202, 217; two courses chosen from OR 262, 271, Stat 223, OR 273/Stat 173, OR/Stat 284; plus three electives chosen in consultation with the advisor. Students are required to pass a written Master's Comprehensive Examination. The program is offered jointly with the Department of Statistics in Columbian School of Arts and Sciences.

Industrial Engineering—This area of concentration is offered through the fields of Computer Science, Electrical Engineering, Engineering Management, Mechanical Engineering, and Operations Research.

Prerequisite: Math 33; ApSc 115; and either CSci 49, 50, 51, or 100. Required: EMgt 260; EngS 201; OR 282; and a project course selected from EMgt 291, 252, or OR 291; plus a three-course sequence from each of two different departments in the School of Engineering and Applied Science.

Professional Degree Program

The School of Engineering and Applied Science has established the professional degree program for those students who wish to pursue course work beyond the master's degree with emphasis on applied subject material rather than on basic research. Successful completion of the professional degree program leads to the degree of Engineer or of Applied Scientist.

Entrance Requirements

Admission to study toward the professional degree requires an appropriate master's degree from a recognized institution and evidence of capacity for productive work in the field selected as indicated by prior scholarship and, where appropriate, professional experience. The Department of Electrical Engineering

and Computer Science requires applicants for the professional degree program to have had two years of professional experience after receiving the master's degree.

To study toward the degree of Engineer, an applicant must have earned a bachelor's degree and a master's degree in an area of engineering.

To study toward the degree of Applied Scientist, an applicant must possess a bachelor's degree in engineering, mathematics, or natural science and a master's degree in engineering, natural science, mathematics, or administration. Applicants who have an equivalent quantitative background may be considered as special cases by the respective departments.

Normally, a *B* average in graduate work is required. However, the minimum does not assure acceptance; the departments often set higher admission standards.

Some programs have specified prerequisites. An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate and graduate courses. In no case may courses thus taken fulfill any part of the requirements for the professional degree.

Program Requirements

The minimum program consists of 30 credit hours of approved graduate courses beyond a master's degree. Students whose graduate study does not include necessary prerequisites may be required to take additional course work.

Programs are determined by established prerequisites and the requirements of the department in which the student wishes to study. The program of each **professional degree** candidate must be approved by the student's advisor and **the department chair**.

Each department may require its degree candidates to undertake and defend the results of a technical design project or a development problem or to prepare a comprehensive technical report to demonstrate the candidate's ability to make independent use of the knowledge and discipline of thought acquired through graduate study. When applicable, the student will be informed of this requirement by the faculty advisor at the time the student's program is being formulated. In no case, however, will this project be more than 6 credit hours out of the minimum 30.

For requirements of a specific professional degree program, please consult the department concerned.

Scholarship Requirements

If a student studying for the professional degree receives two grades of *F* or three grades below *B*−, study is terminated and further enrollment prohibited. A student must have a final grade point average of 3.0 to receive the degree. The Department of Engineering Management requires a final grade-point average of at least 3.4.

Time Limits

A full-time student in the professional degree program is allowed a maximum of three calendar years to complete all degree requirements, from the date of first registration as a degree candidate in prerequisite or graduate courses. A part-time student in this program is allowed a maximum of five calendar years. The limit does not include any period of registration as an unclassified student before admission to degree candidate status or any period spent on approved leave of absence.

Students who do not complete degree requirements within the allowed time will have their degree candidate status terminated. They may be readmitted to degree candidate status under conditions specified by the department chair.

Relationship with the Doctoral Program

Candidates for the Doctor of Science degree or professional degree who are in good academic standing may, with the approval of the faculty advisor and department chair, transfer from one degree program to the other within their department if they meet the qualifications and requirements specified by the department. In the Department of Engineering Management, only one such transfer is permitted.

Doctor of Science Degree Program

The doctoral program is designed to prepare the student for a career of creative scholarship by providing a broad but balanced background of knowledge and guidance in the performance of research. The program is divided into two stages. The first, made up of a study of related fields of learning that support the general area of research concentration, culminates in the qualifying examination. The second, composed of original research and the presentation of findings in a written dissertation, culminates in the final examination.

Entrance Requirements

Admission to study toward a doctoral degree requires an appropriate earned baccalaureate degree or master's degree from an accredited institution, completed course work designated by the department as pertinent to the field to be studied, an acceptable professional background, and a capacity for creative scholarship. Students whose highest earned degree is a baccalaureate must present a grade-point average (on a scale of 4.0) of at least 3.3 in that degree program, must submit scores from the Graduate Record Examination general test, and must provide two letters of recommendation. For students whose highest earned degee is a master's degree, departmental requirements for the grade-point average in course work leading to that degree are as follows (on a scale of 4.0): Civil and Environmental Engineering, Computer Science, Electrical Engineering, and Mechanical Engineering, 3.4; Engineering Management and Operations Research, 3.5.

Although scores on the GRE are not required for applicants holding a master's degree, an applicant who has taken the GRE should request that the scores be sent to the School of Engineering and Applied Science.

For admission requirements of a specific Doctor of Science degree program, please consult the department concerned.

Program Requirements

Upon admission to the first stage of the program (that is, study of related fields culminating in the qualifying examination), the student is assigned a faculty advisor who directs his or her studies. In some departments a faculty committee may be appointed instead of a single advisor. Programs of study are structured to include a major field and (with the exception of the Department of Engineering Management) two minor or supporting fields. In the Department of Civil, Mechanical, and Environmental Engineering, one of the minor fields must be outside Applied Science. In the Department of Electrical Engineering and Computer Science, both minor fields may be outside the department. In the Department of Operations Research, one of the minor fields must be in a doctoral field within the department. In the Department of Engineering Management, only one minor field is required, and students are encouraged to select the field outside the department.

A minimum of 30 credit hours in a formal program at the graduate level beyond master's study or, for students without master's degrees, a minimum of

credit hours in a formal program at the graduate level beyond the baccalaureate, is required. In many cases, particularly when the student undertakes a doctoral program in a field other than that in which the earlier degree was obtained, the program of study exceeds the minimum number of credit hours. In addition, all doctoral students take a minimum of 24 hours of dissertation research.

Students admitted to doctoral study are encouraged to undertake one year of full-time study on campus. In general, the advisor will require the student to register for a minimum of 6 credit hours of course work in every semester except the summer sessions.

To be admitted to the qualifying examination, the student must have an overall grade-point average of 3.2. The Department of Engineering Management requires a cumulative grade point average of at least 3.4.

If a doctoral student receives two grades of *F* or three grades below *B*−, graduate study is terminated and further enrollment prohibited. Courses in which the student earns grades below *B* − are not included in the total credit-hour requirement for the degree. Students who receive any grade below *B* are required to review their programs of study with their advisors.

Special Requirements

Departments may establish a tool requirement, such as an examination in a computer language.

The Department of Engineering Management requires reading knowledge of a foreign language to be demonstrated before the qualifying examination may be taken. The student must obtain the advisor's approval of the language selected. Students from countries where English is not an official language must satisfy the foreign language requirement by passing an English tool examination administered for doctoral students by the Department of English as a Foreign Language before the end of the first semester of residence in the doctoral program.

The Department of Operations Research requires doctoral candidates to successfully complete a written examination on the basic master's level courses OR 209, 216, 251, 252, 277, and 281 before formally entering doctoral candidacy.

The Qualifying Examination

The qualifying examination is the principal means of determining whether a student will qualify as a candidate for the doctoral degree and progress to the second stage of the program. Its purpose is to ascertain that the student's background and intellectual development are adequate to support doctoral research in the central field. (Some departments may administer a prequalifying examination prior to completion of the study program.)

Qualifying examinations may be written or oral, or both, and are scheduled over a period of several days. They are conducted only during the fall and spring semesters (fall semester only in the Department of Civil, Mechanical, and Environmental Engineering), on dates established by the departments, and are administered by a faculty committee. Upon favorable report of the examiners to the dean through the department chair, the student is admitted to candidacy for the degree. The student then begins specialized study and research under the supervision of a designated member of the faculty or, in special instances, an outstanding engineer or scientist who is not a member of the faculty.

At the discretion of the committee that prepared the examination, a student who fails any part of the qualifying examination may be given a second opportunity to qualify for candidacy. Usually, the entire examination must be retaken. Students who fail to qualify for candidacy in a doctoral program of the School may be considered to have failed on a school-wide basis and will not be admitted to further doctoral study within the School.

Dissertation and Final Examination

The student admitted to candidacy for the degree of Doctor of Science chooses the faculty member under whom he or she wishes to conduct research; the faculty member may accept or reject the request to serve as the student's director of research. The research area is approved by the director, and throughout the remainder of the doctoral program the candidate conducts dissertation research under the director. However, the student may consult other members of the faculty on an informal basis. Work on the dissertation encompasses a minimum of 24 credit hours.

The Dissertation—A dissertation is required as evidence of ability to perform original scholarly research and to present and interpret the results. The student is solely responsible for the content of the dissertation.

The dissertation should embody the results of an extended original study and include material deemed worthy of publication in recognized scientific and engineering journals. The student is expected to attempt to have the results of the research published as soon as possible after he or she receives the degree and to submit copies of the published material to the dean. Credit must be given in the publication to the fact that the material is abstracted, summarized, or developed from a dissertation submitted to George Washington University in partial fulfillment of the requirements for the Doctor of Science degree.

The candidate must submit to the department five complete copies of the dissertation and an abstract (not to exceed 350 words) no later than the date specified in the calendar. The abstract is included in the announcement of the final examination and is reproduced by University Microfilms, Inc. One copy of the dissertation is also sent to University Microfilms, Inc.

Copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in department offices. The successful candidate for the doctorate is required, before receiving the degree, to pay a fee to cover part of the expense of printing the abstract and for the basic service rendered by University Microfilms, Inc. Accepted dissertations, with accompanying drawings, become the property of the University and are deposited in the Gelman Library where bound copies are available for circulation.

The Final Examination—Upon acceptance of the dissertation by the research committee, the candidate is presented for the final examination. The final examination is oral and is open to the public. The candidate must demonstrate a mastery of the special field of study and of the materials and techniques used in the research. The committee of examiners may include qualified experts brought to the University especially to participate in the examination. The director of research usually serves as advocate for the candidate. When the examining committee is convinced of the quality and originality of the candidate's contribution to knowledge as well as his or her mastery of the scholarship and research techniques of the field, the committee recommends the candidate for the degree of Doctor of Science. The candidate should consult the department chair about scheduling the examination.

Enrollment Requirements

Full-time doctoral students must register for a minimum of 9 hours per semester until 24 hours of Dissertation Research have been completed, and 1 hour of Continuing Research each semester thereafter until satisfactory completion of the final examination.

Part-time doctoral students must normally register for a minimum of 6 hours per semester until 24 hours of Dissertation Research have been completed, and 1 hour of Continuing Research each semester thereafter until satisfactory completion of the final examination.

No minimum load is required during the summer sessions

Time Limits

In general, one year of study is the minimum amount of time to be spent in preparation for the qualifying examination, although the student may apply for the examination whenever he or she feels properly prepared. The qualifying examination must be completed within five years of the date of admission, and the entire degree program must usually be completed within seven years. (Full-time students in the doctoral program in engineering management are allowed a maximum of five calendar years to complete all degree requirements.) A minimum of two years of full-time study and research should be expected in meeting the requirements for the degree. The time period for completion of the degree will be adjusted for an approved leave of absence. All time periods listed above are increased by two years for a student entering the doctoral program without a master's degree.

Certificate Program

The School of Engineering and Applied Science offers an 18-credit-hour certificate program in the fields of computer science, electrical engineering, mechanical engineering, engineering management, and operations research. At the discretion of the respective departments, credit earned in the certificate program can be applied to a subsequent degree program. Details are available in the office of the dean.

ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS

Dean H. Harding
Associate Deans E.A. McCord, N.J. Brown

Introduction

The Elliott School of International Affairs offers graduate and undergraduate programs to prepare individuals for an increasingly international and multinational environment. The historical roots of the Elliott School can be traced back to the establishment of the School of Comparative Jurisprudence and Diplomacy in 1898. In 1966, the School separated from the School of Government, Business, and International Affairs to become an independent unit, the School of Public and International Affairs. In 1987, the name was changed to the School of International Affairs, and in 1988 the School was renamed in honor of Evelyn E. and Lloyd H. Elliott, the President of George Washington University from 1965 to 1988.

Master's Degree Programs

The Elliott School offers degree programs leading to the Master of Arts in the fields of international affairs, European studies, international development studies, international trade and investment policy, Latin American studies, East Asian studies, Russian and East European studies, security policy studies, and science, technology, and public policy. The Elliott School also offers a Master of International Policy and Practice degree for mid-career professionals.

Programs are multidisciplinary and emphasize both domestic and foreign governmental policy. Course offerings draw heavily on the various academic departments of the University. Students develop a higher level of competence in a world region or a discipline that includes a solid understanding of major

historical and contemporary issues in international affairs, as preparation for professional employment in government, international and nonprofit organizations, agencies, or business.

Admission Requirements

Admission is normally for the fall semester only and may be for full- or part-time study. Admission to master's programs in the Elliott School is highly competitive. To be considered for admission, applicants must present a bachelor's degree from an accredited college or university. Records of academic performance, letters of recommendation, and a personal statement are the principal components of an application. Scores on the general test of the Graduate Record Examination are required for Master of Arts applicants and encouraged but not required for Master of International Policy and Practice applicants. In addition, the applicant's motivation, professional experience, and academic preparation in economics and foreign language study will be considered in the selection process. Eight years of professional experience are generally required of Master of International Policy and Practice applicants.

The following additional requirements pertain to all applicants from countries in which English is not an official language—Applicants are required to submit scores from the Test of English as a Foreign Language (TOEFL). The Test of Written English (TWE) is also recommended. The minimum TOEFL score for admission to the Master of Arts programs is 590 and to the Master of International Policy and Practice program is 600. Applicants admitted as degree candidates will be required to take the English as a Foreign Language (EFL) Placement Test at George Washington University before registering. (Those who score 600 or more on the TOEFL are exempted.) EFL course work may be required, depending on the applicant's performance on the placement test, but may not be applied toward the degree.

International Affairs—The applicant's undergraduate program should include courses in international affairs or other relevant social sciences, including introductory micro- and macroeconomics and at least two years of undergraduate study of a modern foreign language. In the case of major deficiencies in the social sciences (especially economics) or foreign language preparation, additional course work may be specified beyond the minimum requirements for the master's degree.

East Asian Studies—An undergraduate major in a pertinent field and at least two years of study of an appropriate Asian language are required. For the concentration in Chinese language and literature, the undergraduate program should include 24 credit hours of Chinese language study.

European Studies—An undergraduate major in a related field is preferred, including a good background in European history and political systems. Satisfactory completion of two years of an appropriate European language and a full-year course in introductory economics that includes a semester each of macro- and microeconomics are required.

International Development Studies—Previous course work in international development is generally required but may be waived for those students who enter the program with strong analytical skills. Students are advised to complete a course in introductory microeconomics, a course in statistics, and at least two years of study of a modern foreign language before admission. The extent of required previous study or training will differ, depending on the discipline or specialization chosen. Check with the Elliott School for program requirements.

International Trade and Investment Policy—The applicant's undergraduate program should include at least one semester each of introductory microeconomic theory, introductory macroeconomic theory, statistics, and at least two years of

of a modern foreign language. Undergraduate courses in intermediate micro- and macroeconomics are highly desirable.

Latin American Studies—The applicant's undergraduate program should include background course work related to Latin America and at least two years of study of Spanish or Portuguese. Majors in other fields may be considered for admission provided that undergraduate course work includes Spanish or Portuguese and sufficient course work in one of the following areas: anthropology, economics, geography, Hispanic literature, history, and political science.

Russian and East European Studies—An undergraduate major in a pertinent field is required. The undergraduate program should include a full year of Russian or Central/Eastern European history, a course in Russian or Central/Eastern European government or politics, and at least two years of Russian or another pertinent language of the region.

Science, Technology, and Public Policy—Undergraduate majors in a social, life, or physical science or in engineering are eligible for admission. Analytic skills and interest in policy issues with significant science or technology dimensions are more important determinants of success in the program than any particular formal training or academic background.

Security Policy Studies—An undergraduate background similar to that specified above for International Affairs would be appropriate. Work experience in the military or national security fields might compensate in part for inadequate academic preparation. A background in economics or quantitative analysis skills would also be helpful.

Readmission

A graduate student who has not been continuously enrolled, or on approved leave of absence or inactive status, must file an application for readmission the semester before planning to return to school.

Regulations

See Fees and Financial Regulations; University Regulations.

Attendance

Students are held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor before provision is made to make up the work missed. A student suspended for any cause may not attend classes during the period of suspension.

Withdrawal

Withdrawal without academic penalty after the end of the eighth week of classes (fall or spring semester) is permitted only in exceptional cases (see Withdrawal under University Regulations).

Scholarship Requirements

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *CR*, Credit; *I*, Incomplete; *IPG*, In Progress; *W*, Authorized Withdrawal; and *Z*, Unauthorized Withdrawal. Other grades that may be assigned are *A*−, *B*+, *B*−, *C*+, and *C*−. Courses taken to satisfy degree requirements cannot be taken on a Credit (CR) basis, with the exception of Thesis Research for M.A. students and the M.I.P.P. Seminar for M.I.P.P. students.

Graduate students are required to maintain a minimum cumulative grade-point average of 3.0. Students whose cumulative grade-point average falls below

3.0 at any time after having completed at least 9 credit hours will be given an additional semester in which to raise the grade-point average above 3.0. Those who fail to bring their grade-point average over 3.0 at the end of the additional semester will not be allowed to continue in the program. For part-time students and those enrolled in summer sessions, a semester is interpreted to mean a time interval in which at least 9 credit hours have accrued.

A master's candidate who receives a grade of *F* is required to present cause for consideration by the Dean's Council as to why he or she should be allowed to continue in the program of studies.

Whenever a grade has not been assigned, the symbol *I* (Incomplete) or *W* (Authorized Withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. When work for the course is complete, the grade earned will be indicated by the letter *I* followed by the letter grade. An Incomplete cannot be made up after the lapse of one calendar year. An Incomplete that is not made up by the end of one calendar year remains as a grade of *I* on the student's record. An Incomplete cannot be removed by registering for the course. No student will be permitted to register for courses or participate in the capstone policy project if there are more than two Incompletes outstanding on the record.

A student who fails to meet the established deadlines for completion of course work or other elements of the program (e.g., capstone policy project) and is granted an extension may be required by the dean and the Dean's Council to register for 3 credit hours of graduate Reading and Research for each semester that the work is delinquent.

General Requirements for Master of Arts Degree Programs

Programs leading to the Master of Arts degree vary in their requirements. Most programs require a minimum of 36 credit hours of graduate course work and may include a thesis. The Security Policy Studies program does not have a thesis option; the Chinese language and literature concentration of the East Asian Studies program requires the thesis option. In all programs, students must participate in a multidisciplinary capstone policy project at the conclusion of the program.

Candidates for the degree of Master of Arts are required to submit an advised, approved plan of studies (fields, supporting course work, etc.) to the office of student services by the end of the first semester in residence. Master's degrees are awarded by vote of the faculty after the student has completed the required course work and an acceptable thesis (if one is elected), has satisfied the foreign language or tool requirement, and has successfully completed the capstone policy project.

Under special circumstances undergraduate courses numbered 101–200 may be counted toward the master's degree when registration for graduate credit has been approved at the beginning of the course by the curriculum advisor, the instructor, and the dean. The student who takes an undergraduate course for graduate credit is expected, by arrangement with the instructor, to do work at a graduate level in addition to the regular work of the course. Normally, not more than 9 hours of undergraduate course work may be taken for graduate credit in the 36-credit-hour program. Academic credit counted toward a previous degree may not be counted toward the master's degree.

All master's degree candidates must complete degree requirements within five years of their admission to the program. A student who is unable temporarily to continue the plan of studies may request a leave of absence not to exceed one year. Extensions beyond the five-year period may be granted for exceptional circumstances, but the student will be required to register and pay for 3 credit hours of Reading and Research each semester.

No credit is granted for work done in absentia or without formal instruction, except for the thesis, which may be completed in absentia with the permission of the curriculum advisor and the dean. No more than 6 hours of graduate credit may be transferred from other accredited institutions or another division of the University, and these may be accepted only under limited conditions of time, grades, and relevance to the student's program.

Curriculum Requirements

Curriculum requirements for the Master of Arts programs are listed under the appropriate heading in Courses of Instruction—International Affairs: East Asian Studies; European Studies; International Development Studies; International Trade and Investment Policy; Latin American Studies; Russian and East European Studies; Science, Technology, and Public Policy; and Security Policy Studies. All fields allow up to 3 credits of IAff 201 to be applied toward the degree. Students should consult the program director concerning Special Topics courses that may be applicable to their program.

Foreign Language Requirements

In most degree programs, a candidate for the degree of Master of Arts must demonstrate reading and speaking proficiency (certified by the relevant language department) in a modern foreign language. Students in regional programs must demonstrate their ability in a language appropriate to the study of the specific region. If a student selects a language not offered by the University, a testing fee will be charged.

For all Elliott School degree programs, students who are not native speakers of English are also required to pass an English tool examination; this requirement is in addition to the TOEFL required for admission. The tool examination, which tests high-level reading and writing proficiency, is administered by the English as a Foreign Language Department, and must be successfully completed before the end of the candidate's second semester. This requirement is in addition to the quantitative research methods tool in the security policy studies program.

Candidates in international affairs, international development studies, and security policy studies may petition the dean to substitute an advanced course in statistics for a foreign language. The primary basis for approving such petitions will be the relevance of the statistical skills to the student's professional goals or thesis research.

Each student must take a diagnostic exam in a foreign language during graduate student orientation. The students must also pass a reading and oral exam during the last 18 hours of residence in the program. No student may take the language examination more than three times. Students should consult their program guidelines for specific requirements, possible academic credit, and options concerning the tool requirement.

Capstone Policy Project

Every student must successfully complete a capstone policy project near the conclusion of the master's program. Most programs offer the project once a year, during the spring semester. The student must have a 3.0 grade-point average before participating in the project. If there is a lapse of time between completion of course work and the policy project, the student must be continuously enrolled during this period. A student who fails to successfully complete the project may repeat it with the permission of the dean. If the student fails a second time, no further opportunity to complete the project will be permitted and the degree will not be conferred. Specific rules concerning the policy project vary among programs. Students should consult their program guidelines for details.

The Thesis

Exceptional students may write a thesis if they qualify by having a minimum 3.5 grade-point average for at least 18 hours of course work in their program, submitting for approval a previously written research paper of high quality, and developing a formal thesis proposal approved by their prospective thesis advisor.

The thesis subject should be selected as early as possible so as to permit effective integration with the course work. A student will not be permitted to register for Thesis Research (IAff 299–300) until the thesis subject has been formally submitted to the dean's office. Most programs set additional requirements in order to qualify to write a thesis. The subject must be approved by the member of the faculty under whom the thesis is to be written, a second member of the faculty who will serve as a reader, and the student's program director. The thesis in its final form must have the approval of the thesis director and one other reader, and two copies must be presented to the dean by the student no later than the date announced in the University Calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the student services office.

Payment of tuition for thesis research entitles the candidate, during the period of registration, to the advice and direction of the thesis director and the other reader. In case a thesis is unfinished, the student must maintain continuous enrollment and is allowed one calendar year to complete it. If the preparation of the thesis extends beyond the additional calendar year, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

General Requirements for the Master of International Policy and Practice Degree Program

The Master of International Policy and Practice requires a minimum of 27 credit hours of graduate course work. Students are required to take one course in either international or comparative politics, one course in international economics, and the M.I.P.P. Seminar. For the remainder of the program, students must submit an advisor-approved plan of studies to the program director before the start of the first semester in residence.

Under special circumstances undergraduate courses numbered 101–200 may be counted toward the master's degree when registration for graduate credit has been approved at the beginning of the course by the program director, the instructor, and the dean. The student who takes an undergraduate course for graduate credit is expected, by arrangement with the instructor, to do work at the graduate level in addition to the regular work of the course. No more than 6 hours of undergraduate course work may be taken for graduate credit in the 27-hour program.

M.I.P.P. candidates must complete degree requirements within three years of their admission to the program. A student who is temporarily unable to continue the plan of studies may request a leave of absence not to exceed one year. Extensions beyond the three-year period may be granted in exceptional circumstances, but the student will be required to register and pay for 3 credit hours of Reading and Research each semester.

No credit is granted for work done in absentia or without formal instruction. No transfer credits from any institutions other than The George Washington University are accepted into the M.I.P.P. program. No more than 6 hours of graduate credit taken as a non-degree student may be transferred from any school within The George Washington University, including the Elliott School's M.I.P.P. program.

Special Programs

Joint Master of Arts and Juris Doctor Degree Program

The Elliott School of International Affairs cooperates with the Law School in offering a program of study leading to the degrees of Master of Arts and Juris Doctor. A student must be accepted for admission by both the Elliott School and the Law School. Applications should be made separately but at the same time. Alternatively, students may apply for the joint degree program after they have begun either degree program. Both the Elliott School and the Law School should be notified that the student is interested in the combined program. The Law School stipulates that the first year of course work for the Juris Doctor degree must be taken as a unit; students should consult with the Associate Dean of the Law School for Student Affairs.

The Master of Arts degree program consists of a 36–42-credit-hour program that may not include a thesis. The student selects a degree program offered by the School and fulfills all of the requirements for the Master of Arts degree as well as fulfilling the requirements for the Juris Doctor degree.

The Law School will accept up to 12 credit hours of Elliott School courses; the Elliott School will accept up to 12 credit hours of Law School course work as part of this joint degree program. The program takes approximately four years of full-time study for completion.

Students will be registered in both the Elliott School and the Law School and must maintain this concurrent registration until all degree requirements have been completed. All work for this combined degree program must be completed in five years, unless an extension of time is granted by the respective deans.

Joint Master of Arts and Master of Business Administration Degree Program

The Elliott School of International Affairs cooperates with the School of Business and Public Management in offering a program of study leading to the degrees of Master of Arts in one of five fields and Master of Business Administration with a field of study in international business. The joint degree program is offered in the Elliott School fields of international affairs, international trade and investment policy, East Asian studies, European studies, Latin American studies, and Russian and East European studies. The student must be accepted for admission by both the Elliott School and the School of Business and Public Management. Students may apply for the joint degree program after they have begun either degree program. The program consists of a minimum of 63 credit hours of course work. Joint degree students must meet all requirements for each program prior to receiving either diploma.

Graduate Certificates

The Elliott School of International Affairs offers programs of study leading to a graduate certificate in regional studies in Chinese studies, East Asian studies, European studies, Latin American studies, and Russian and East European studies and functional specialties in international trade policy, international science and technology policy, international security policy, U.S. foreign policy, and political psychology. The program is open to students presently enrolled in all Elliott School and School of Business and Public Management programs at The George Washington University or other universities, students who have already earned a graduate degree, and students with a bachelor's degree and a minimum of eight years of relevant work experience. Additional information is available in the Elliott School Graduate Admissions office.

Institute for European, Russian, and Eurasian Studies

The Institute for European, Russian, and Eurasian Studies is a research center within the Elliott School. The Institute's research associates include University faculty members and visiting scholars in the disciplines of international affairs, political science, economics, history, geography, sociology, and relevant languages and literatures. Cross-disciplinary work is strongly encouraged. The Institute hosts numerous foreign visitors and brings distinguished foreign and American scholars to the University as visiting fellows each year. Institute members develop and conduct their own research projects, often with the support of funding sources outside the University; develop and participate in scholarly conferences, seminars and colloquia; and present public lectures. Many are called upon to advise leaders and agencies of the U.S. government and to provide expert commentary to the media. Most members of the Institute are full-time members of the GW faculty and play a major role in teaching graduate students in discipline-based master's and doctoral programs and in interdisciplinary master's programs. Institute faculty also administer and teach in three geographic-area–based Elliott School graduate programs: European Studies, Russian and East European Studies, and East Asian Studies.

Center for International Science and Technology Policy
Space Policy Institute

The Center for International Science and Technology Policy is a locus for research and the exchange of information and ideas. In addition to overseeing the M.A. program in science, technology, and public policy, the Center organizes seminars and meetings, sponsors research, and hosts visitors from elsewhere in the United States and abroad.

Within the Center for International Science and Technology Policy, the Space Policy Institute is an independent center of competence in an important area of national and international activity. The Institute focuses on policy issues related to civilian space activities and their interactions with national security space programs. It conducts research on space policy issues and organizes seminars, symposia, and conferences.

Sigur Center for Asian Studies

The mission of the Sigur Center is to contribute to scholarly research and publication on Asian affairs, promote U.S.–Asian scholarly and policy interaction, and educate a new generation of students, scholars, analysts, and policymakers prepared to deal with the rapidly expanding role of East Asia and the Pacific Rim in world affairs. The Center sponsors ongoing research projects and study groups concerning political, economic, and security issues relating to Asia and the interaction between Asia and the United States. The Center has hosted bilateral and multilateral conferences in many Asian capitals, including Beijing, Pyongyang, Seoul, Taipei, and Tokyo, as well as Washington, D.C. The Center supports a Distinguished Visiting Professors Program that serves to enhance teaching and academic research with respect to Japan/North and South Korea/China/Taiwan/Southeast Asian studies. It administers a Visiting Research Fellows Program, bringing to the Center each year eminent scholars and policy planners from universities and government organizations both in the United States and in Asian countries.

COURSES OF INSTRUCTION

The following section provides listings and descriptions of courses offered by the departments of instruction and interdepartmental programs.

Degree requirements of departments and programs in Columbian School of Arts and Sciences and the Elliott School of International Affairs appear under the department or program heading; degree requirements of the School of Engineering and Applied Science, the Graduate School of Education and Human Development, and the School of Business and Public Management appear under the respective school's section.

To determine the content of required or prerequisite courses below the 200 level, see the Undergraduate Programs Bulletin.

The number of credit hours given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the title of the course. Thus, a year course giving 3 credit hours each semester is marked (3–3), and a semester course giving 3 credit hours is marked (3). A credit hour may be defined as one 50-minute period of class work or one laboratory period a week for one semester.

Following most course descriptions is a parenthetical statement listing the semester (fall or spring) for which the course is scheduled. The term *academic year* is used only with two-semester courses and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. Not all offerings for the summer sessions are listed in this Bulletin. Students should consult the Summer Sessions Announcement for additional summer offerings. Schedules of Classes are published for the fall and spring semesters to provide information concerning the time of course offerings.

The courses as listed here are subject to change. The University reserves the right to withdraw any course announced or to change the course fees shown herein.

Explanation of Course Numbers

Courses numbered 1–100 are planned for students in the freshman and sophomore years. With the approval of the advisor and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

Courses numbered 101–200 are planned for students in the junior and senior years. Except for accountancy courses, they may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work to receive graduate credit. Accountancy courses numbered 101–200 may not be taken for graduate credit.

Courses numbered 201–300 are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Business and Public Management registering for these courses must have a 3.0 average, the prior approval of the department chairman who is responsible for the graduate course, and the prior approval of the dean. Nondegree students who have not completed a bachelor's degree may not enroll in graduate courses offered by the School of Business and Public Management. A few courses are numbered in the 400s to set them apart for various administrative reasons; these courses are generally analogous to courses numbered in the 200s.

Courses numbered 301–400 in Columbian School of Arts and Sciences and the School of Engineering and Applied Science are limited to graduate students. They are primarily for doctoral candidates. Courses numbered 301–400 in the School of Business and Public Management are primarily for doctoral stu-

dents: the courses are open to selected master's students upon approved petition. In the Graduate School of Education and Human Development courses numbered 301–400 are limited to graduate students with master's degrees from accredited institutions.

Courses numbered 701 and 721 represent an ongoing program of curriculum innovation at GW. The 701 number is used to designate experimental courses taught by individual faculty members. The 721 number designates innovative interdepartmental courses. The 751 number is used to list courses sponsored jointly by two or more schools. Courses numbered in the 770s and 780s are taught by scholars who hold appointments as University Professors. The 700 numbers do *not* indicate the level of difficulty. Courses in this series range from freshman-level offerings to classes designed for seniors and graduate students. Unless the course description in the *Schedule of Classes* indicates that there are prerequisites or that an interview with the instructor is required prior to registration, 700 courses are open to all interested students, subject to their advisor's approval and the rules of the respective schools.

Key to Abbreviations

The following abbreviations are used for course designations:

Accy	Accountancy
AdSc	Administrative Sciences
AmSt	American Studies
Anat	Anatomy
Anes	Anesthesiology
Anth	Anthropology
ApSc	Applied Science
Arab	Arabic
Art	Art
ArTh	Art Therapy
Astr	Astronomy
Bioc	Biochemistry
BlSc	Biological Sciences
BmSc	Biomedical Sciences
Bios	Biostatistics
BAdm	Business Administration
Chem	Chemistry
Chin	Chinese
CE	Civil Engineering
Clas	Classical Studies
CSAS	Columbian School of Arts and Sciences
Comm	Communication
CpIS	Computational Sciences
CpMd	Computer Medicine
CSci	Computer Science
Cnsl	Counseling
Derm	Dermatology
Econ	Economics
Educ	Educational Leadership
EE	Electrical Engineering
EMda	Electronic Media
EMed	Emergency Medicine
EMgt	Engineering Management
EngS	Engineering Science
Engl	English
EFL	English as a Foreign Language
E&RP	Environmental and Resource Policy
Envr	Environmental Studies
Epid	Epidemiology
EMBA	Executive Master of Business Administration
ExSA	Exercise and Sport Activities
ExSc	Exercise Science
Fina	Finance
ForS	Forensic Sciences
Fren	French
Gnet	Genetics
Geob	Geobiology
Geog	Geography
Geol	Geology
Ger	German Language and Literature
Grek	Greek
HCS	Health Care Sciences
HSci	Health Sciences
HSMP	Health Services Management and Policy
Hebr	Hebrew
Hist	History
Honr	Honors
HRD	Human Resource Development
HmSc	Human Sciences
HmSr	Human Services
Hmn	Humanities
Idis	Interdisciplinary Courses
IAff	International Affairs
IBus	International Business
Ital	Italian
Japn	Japanese
Jour	Journalism
Kor	Korean
Latn	Latin
Law	Law
Ling	Linguistics
Mgt	Management Science
Mktg	Marketing
MBAd	Master of Business Administration
Math	Mathematics
ME	Mechanical Engineering
Med	Medicine
Micr	Microbiology

Onco	Molecular and Cellular Oncology
MStd	Museum Studies
Mus	Music
NSc	Naval Science
NSur	Neurological Surgery
Neur	Neurology
NeuS	Neuroscience
Ob&G	Obstetrics and Gynecology
OR	Operations Research
Opht	Ophthalmology
Orth	Orthopaedic Surgery
Path	Pathology
PStd	Peace Studies
Peds	Pediatrics
Phar	Pharmacology
Phil	Philosophy
Phys	Physics
Phyl	Physiology
PCm	Political Communication
PMgt	Political Management
PPsy	Political Psychology
PSc	Political Science
PsyD	Professional Psychology
Psyc	Psychiatry and Behavioral Sciences
PAd	Psychology
PubH	Public Administration
	Public Health
PPol	Public Policy
Rad	Radiology
Rel	Religion
Rom	Romance Literatures
SMPA	School of Media and Public Affairs
SLP	Service–Learning Program
Slav	Slavic Languages and Literatures
Soc	Sociology
SocL	Sociology/Legal Assistant Program
Span	Spanish
SpEd	Special Education
SpHr	Speech and Hearing
Stat	Statistics
SMPP	Strategic Management and Public Policy
Surg	Surgery
TrEd	Teacher Education
TCom	Telecommunication
TrDa	Theatre and Dance
TStd	Tourism and Hospitality Management
Univ	University
Urol	Urology
Viet	Vietnamese
WStu	Women's Studies
Ydsh	Yiddish

ACCOUNTANCY

Professors C.M. Paik, M.G. Gallagher, J. Hilmy, D.R. Sheldon (*Chair*), W.R. Baber, C.E. Tierney
Associate Professors L.G. Singleton, K.E. Smith, L.C. Moersen, F. Lindahl, K.R. Kumar
Assistant Professor G. Visvanathan

See the **School of Business and Public Management** for programs of study in accountancy leading to the degrees of Master of Accountancy, Master of Science in Professional Accounting, Master of Taxation, and Doctor of Philosophy.

201 **Financial Accounting** (3) Visvanathan, Sheldon
Basic concepts and methods used in financial statements. Use and preparation of the income statement, balance sheet, and statement of cash flows; application of concepts to accounting and reporting issues, including revenue and expense recognition, cash, receivables, inventory, marketable securities, long-lived assets, and debt and equity securities. Same as MBAd 210. (Fall and spring)

202 **Management Accounting** (2) Park, Lindahl
The role of accounting in the decision-making processes of management; understanding of how accounting influences resource allocation decisions in the organization. Prerequisite: Accy 201 or MBAd 210. Credit cannot be earned for both Accy 202 and MBAd 211. (Fall and spring)

203 **Principles of Financial Accounting and Accounting Information Systems** (4) Staff
Basics of accounting, income measurement and the four basic financial statements. Methods of asset valuation, including inventory, accounts receivable, and long-term assets. Information and control structures of the firm. How organizations finance expansion and investment in capital assets. Overall design of an information system. Prerequisite: M.S.P.A. degree candidacy. (Summer)

211 **Business Law: Contracts, Torts, and Property** (3) Moersen
Essential legal principles of contracts, torts, and property, including trusts and estates, leases, professional liability, and the Uniform Commercial Code. Same as SMPP 211. (Fall)

212 **Business Law: Enterprise Organization** (3) Moersen
The legal aspects of organizing, financing, and operating an enterprise: agency, partnerships, corporations, securities regulation, insurance, suretyship, secured credit financing, and commercial paper. Same as SMPP 212. (Spring)

221 **Cost and Budget Analysis** (3) Park
An advanced cost analysis course, with emphasis on comparative costs, quantitative techniques for cost data, managerial reporting systems, and manufacturing efficiency studies. Prerequisite: Accy 201 and 202 or MBAd 210 and 211. (Spring)

225 **Financial Reporting Standards** (3) Sheldon
A critical understanding of the Financial Accounting Standards Board Pronouncements and professional standards for compilation of financial statements. Analysis of alternative accounting treatments by management in financial reporting. Prerequisite: Accy 201 or MBAd 210. (Fall)

232 **Accounting Theory** (3) Hilmy
Alternative approaches to structuring a financial accounting theory and analysis of the various theoretical interpretations espoused in the process of formulating accounting standards. Prerequisite: Accy 225 or permission of the instructor. (Spring)

242 **Business Income Taxation** (3) Gallegher
Federal tax concepts applicable to individuals, partnerships, fiduciaries, and corporations; emphasis on recognition of tax consequences attached to common business transactions and on tax planning. Not open to Master of Accountancy or Master of Taxation candidates. (Fall)

251 **International Accounting** (3) Hilmy
A study of international accounting standards with emphasis on accounting for foreign conversion requirements compatible with domestic accounting consolidation standards. Prerequisite: Accy 201 or MBAd 210. (Fall and spring)

255 **Business Combinations and Not-for-Profit Organizations** (3) Hilmy
Corporate concepts, business combination policies, including FASB, SEC, AICPA business combination pronouncements. Analysis of combined and consolidated financial statements; accounting for not-for-profit and governmental organizations. Prerequisite or (with approval of instructor) concurrent registration: Accy 225. (Fall)

261 **Federal Income Taxation** (3) Gallegher
A study of federal income taxation, covering gross income, deductions and credits, sales and other disposition of property, capital gains and losses and timing. (Fall and spring)

262 **Federal Income Taxation of Partnerships** (3) Smith
Federal income taxation of partnerships; formation and operation, distributions to partners, liquidation, and transfer of partnership interests. S corporations are considered. Prerequisite: Accy 242 or 261. (Spring)

263 **Federal Income Taxation of Corporations** (3) Gallegher
Federal income taxation of C and S corporations, covering formation and capital structure, nonliquidating distributions, complete liquidations, corporate reorganizations, and the alternative minimum tax. Prerequisite or concurrent registration: Accy 242 or 261. (Fall and spring)

264 **Federal Taxation of Estates and Gifts** (3) Smith
An introduction to the federal taxation of wealth transfers and the income taxation of estates and trusts. Topics include assets that comprise the gross estate, deductions, valuation and liquidity problems, and estate planning. Prerequisite: Accy 242 or 261. (Spring)

265 **Tax Practice and Procedure** (3) Smith
A study of federal tax practice and procedure, including organization of the IRS, ethical responsibilities, statute of limitations, examination of returns, claims for refund, penalties, and tax rulings. Prerequisite or concurrent registration: Accy 261. (Fall)

266 **Corporate Reorganizations and Affiliations** (3) Smith
Advanced study of corporate taxation: corporate reorganizations, multiple corporations, consolidated returns, and carryover of tax attributes. Prerequisite: Accy 261. (Spring)

267 **International Taxation** (3) Gallagher
A comparative analysis of the tax policies of countries that play a significant role in the international trading system. Prerequisite, Accy 201 or MBAd 210. (Spring)

268 **Deferred Compensation** (3) Gallagher, Smith
A study of tax aspects of deferred compensation arrangements, including qualified pension, profit-sharing, and stock bonus plans; retirement plans for self-employed individuals; individual retirement accounts; and stock options. Prerequisite or concurrent registration, Accy 261. (Spring)

269 **Tax Research and Planning** (3) Smith
A study of the legislative, administrative, and judicial sources of federal tax law. Emphasis on the use of tax research tools in locating, interpreting, and communicating tax law and on the complementary relationship between legal research and quantitative decision making. Prerequisite or concurrent registration, Accy 261. (Fall)

275 **Contemporary Auditing Theory** (3) Tierney
A comprehensive survey of contemporary auditing as practiced by external auditors (primarily certified public accountants) and internal auditors (those employed within government and corporate entities). Generally accepted auditing standards; government auditing standards. Planning, directing, and reporting on various audits. Prerequisite, Accy 225. (Spring)

276 **Government Accounting and Auditing** (3) Tierney
Overview of government budgeting, accounting, financial reporting, and auditing required of state and local governments, nonprofit organizations, and colleges and universities. The financial management practices and auditing requirements applicable to private and public sector organizations receiving governmental financial assistance and those subject to governmental audits. (Spring)

282 **Accounting Information Systems and EDP** (3) Staff
Development and application of accounting system theory, including analysis, design, control concepts, and implementation. Integration of electronic data processing, accounting systems, and management information systems. Prerequisite, Accy 201 or MBAd 210. (Fall)

290 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods. May be repeated once for credit. (Fall and spring)

291 **Financial Statement Analysis** (3) Hilmy, Sheldon
Analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors; establishing firms' business profiles; balance-sheet restructuring and the identification of financial and accounting correction measures from financial statements. Prerequisite, Accy 201 or MBAd 210. (Fall and Spring)

298 **Directed Readings and Research** (3) Staff

311 **Seminar: Public–Private Sector Institutions and Relationships** (3) Staff
Same as SMPP 311.

391 **Doctoral Seminar** (arr.) Baber, Park
Reasoning and research in technical areas of accounting; theoretical issues and their application to practice; conceptual themes in professional literature; comparative accounting research analyses. (Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to doctoral candidates. May be repeated for credit.

ADMINISTRATIVE SCIENCES

Professor J. Zendan (*Director*)
Professorial Lecturers I. Baker, O. Jacobs, E. Johnson, R. Sadacca, M. Roberts, R. Belous
Associate Professor N.M. Dixon
Associate Professorial Lecturers B. Kutnick, S. Wehrenberg, L. Friberg, T. Granda
Assistant Professors D.P. Costanza, E.B. Dent
Assistant Professorial Lecturer W.H. Williams

Columbian School of Arts and Sciences offers interdepartmental administrative sciences programs leading to the degree of Master of Arts in the fields of human resources management and organizational management. The programs have been designed for public and private sector professionals who wish to increase their managerial competency and to improve their career potential. The curricula provide knowledge and skills in the social, behavioral, quantitative, and information sciences.

Master of Arts in the field of human resources management—Prerequisite: a bachelor's degree with a *B* average from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences, including 36 credit hours of course work. There is no thesis requirement. All students must pass a Master's Comprehensive Examination. The following courses are required: AdSc 209, 212, 214, 222, 223, 248, Econ 219, Psyc 245; Stat 104.

Master of Arts in the field of organizational management—Prerequisite: a bachelor's degree with a *B* average from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences, including 36 credit hours of course work. There is no thesis requirement. All students must pass a Master's Comprehensive Examination. The following courses are required: AdSc 209, 216, 241, 242, 243; Econ 219, Psyc 245, 259; Stat 104.

201 **Principles of Management Information Systems** (3)
An overview of the management information systems specialty track. Integration of management, information, and systems concepts into a unified framework. Management information systems development, design, implementation, and evaluation strategies.

209 **Management Systems** (3)
An overview of management systems using the systems approach to management and problem solving; understanding long range planning, management of complex projects using computer systems, use of work breakdown structures, critical path planning systems and network analysis, cost-effectiveness analysis, program evaluation.

212 **Current Issues in Personnel Testing and Selection** (3)
Psychometric, legal, and organizational issues in personnel employment testing and selection; reliability and validity of selection instruments, and the validation of selection systems. The legal environment, including test fairness in selection, adverse impact, and statistical models of test fairness and specific selection techniques. Prerequisite: Stat 104.

213 **Managerial Leadership, Motivation, and Work** (3)
Analysis of leadership behavior and managerial activities. Synthesis of major theories of leadership, including trait, behavior, situational, and power-influence. Synthesis of motivational theories, including acognitive and cognitive perspectives. Application of theories at various levels of formal organization beyond the interpersonal perspective.

214 **Personnel Training and Performance Appraisal Systems** (3)
Management training programs and training evaluation techniques. Performance appraisal techniques, appraisal systems, relationship of rewards to performance, and the appraisal interview. Training and rating systems that satisfy legal requirements and stimulate employee productivity.

215 **Current Issues in Organizational Design** (3)
Analytical framework for the design of complex organizations, including hierarchical bureaucratic, functional, and matrix structures. Examination of organizational technologies, control and boundaries, including design principles emanating from Europe, Japan, and the United States; drawing on system theory and moving toward broader organizational design issues.

216 **Theories and Management of Planned Change** (3)
A systems view of organizational change and development, including intervention strategies, data collection, diagnosis, and the integration and management of system-wide organizational change.

217 **Productivity and Human Performance** (3)
Definitions and measurement of individual, team, and organizational productivity, effectiveness, and efficiency. Models for the analysis of organizational and individual productivity and productivity growth in industrialized nations. Techniques for increasing productivity.

220 **Organizational Decision Making** (3)
Examination of processes in organizational decision making, the state of theory, research and applications for the practicing manager. Topics include managerial style and decision making, problem discovery and diagnosis, search for the design of solution, evaluation and choice, group decision making, decision aids and support systems, and risk analysis.

222 **Theory and Practice of Compensation Management** (3)
Analysis of contemporary compensation systems from both theoretical and practical perspectives, including the latest decisions of courts and regulatory agencies. Examination of motivational theories of pay, determinants and effects of salary structures on performance, incentive plans, performance-based compensation, and managerial compensation systems. Prerequisite: AdSc 214.

223 **Collective Bargaining** (3)
Analysis of federal and state employee relations laws and regulations. Topics include the bargaining environment, wage and benefit issues in arbitration, arbitration of grievances, and employee relations in non-union organizations. Behavioral theories of labor negotiations. Prerequisite: AdSc 222.

240 **Corporate Policy and Social Responsibility** (3)
Examination of the process of policy analysis, development and implementation. Analysis of policy mechanisms, including technology assessment, research and development, regulatory and control mechanisms. Illustrative examples of policy issues and problems drawn from government and industry, covering a broad range of substantive areas.

241 **Strategic Management and Policy Formation** (3)
Processes and theories of strategic management in the profit and not-for-profit sectors. Analysis of behavioral, sociopolitical, and economic forces underlying strategy formulation. Issues of strategic competitive advantage, corporate diversification; multinational corporations; evaluation and choice, and implementation of functional and corporate strategies.

242 **Organizational Communication and Conflict Management** (3)
Theories and models of communications and communication media; barriers to effective communication and techniques for improving interpersonal, group, and organizational communications. Sources of conflict in organizations at the individual, group, and organizational levels; methods of conflict management and resolution.

243 **Seminar: Leadership in Complex Organizations** (3)
The view of leadership taken in this seminar extends theories beyond the interpersonal, near-immediate time frame toward an organizational perspective in which cause-and-effect linkages are traced. The leadership role as an initiator of a system. How effective leaders reduce uncertainty through appropriate adaptive change.

246 **Comparative Management** (3)
International dimensions of management over a broad spectrum of topics, including cross-national transfer and management practices in a global economy, cross-cultural interaction, business-government relations, expatriation and repatriation processes; international strategic management, technology transfer, globalization of human resources management.

248 **Strategic Human Resource Planning** (3)
Overview of the principles of human resource planning. Model for determining human resource requirements, including forecasting, goal setting, human resource auditing, and environmental scanning. Analysis of the interfaces between human resource planning and personnel selection, job design, training, compensation, and related functions.

249 **Human Resource Information Systems** (3)
Analysis of information systems designed to support planning, administration, decision making, and control activities of human resource management. Examination of applications such as personnel selection and performance appraisal systems, payroll and benefit management, and career pathing. Prerequisite: AdSc 248 and 201 or 221, or permission of instructor.

295 **Directed Research** (arr.)
Supervised research in selected fields within administrative sciences. Admission by prior permission of faculty advisor and instructor.

297 **Special Topics (3)**
Special topics in human resource strategic planning, computer-based learning, human–computer interaction, and organizational design. Prerequisite: Adm 201 or 221 and Psyc 244 or 245.

298 **Directed Readings (arr.)**
Supervised readings in selected fields within administrative sciences. Admission by prior permission of faculty advisor and instructor.

AMERICAN STUDIES

Professors B.M. Mergen, H.F. Gillette, Jr., J.M. Vlach, J.O. Horton, R.W. Longstreth
Associate Professors P.M. Palmer (*Chair*), T.A. Murphy
Adjunct Associate Professor P.J. Crossey
Associate Professorial Lecturers B.G. Carson, R.D. Wagner, D.P. Tiller, E. Mayo
Assistant Professor M. McAlister
Assistant Professorial Lecturer O. Ridout

Master of Arts in the field of American studies—Prerequisite: the degree of Bachelor of Arts in American civilization or a related field.

Required: the general requirements stated under Columbian School of Arts and Sciences, including (1) AmSt 271 (2) 24 credit hours chosen in a carefully related pattern of study of American civilization that includes at least one research seminar; (3) a comprehensive examination covering general competence in American civilization and the candidate's area of concentration; (4) a thesis (6 credit hours) written on a topic approved by the student's advisor or, with permission of the advisor and the director of the program, 12 credit hours of additional course work, 6 of which must be research oriented. Special options in the master's degree program include the following.

1. *A concentration in museums and material culture*—Course emphasis on the use of artifacts in historical research, offered in association with the Smithsonian Institution. Required in addition to the general requirements outlined above: AmSt 250. Recommended courses in decorative arts, architectural history, historical archaeology, history of technology, history of art, and folklife. Programs specific to museum studies and museum education are also available.

2. *A concentration in historic preservation*—Course emphasis on interpreting issues in historic preservation through a humanistic framework. Prerequisite: a course in American architectural history. For this concentration, the general requirements outlined above are amended as follows: Required: 36 credit hours, consisting of 12 hours of American civilization courses including AmSt 271 and at least one research seminar; 18 hours of historic preservation courses including AmSt 277–78; a thesis (6 hours). A comprehensive examination, as outlined above, is required.

3. *A concentration in folklife*—Course emphasis on the expressive culture of American folk societies and theories and methods for their evaluation and interpretation. Required in addition to the general requirements outlined above: AmSt 250, 257. Recommended courses in topics related to folklife, such as regionalism, oral history, material culture, vernacular architecture, and social and cultural history.

Doctor of Philosophy in the field of American studies—This program combines work in the humanities and/or social sciences as preparation for careers in a range of institutions, including universities, museums, archives, libraries, preservation offices, and work in public and private enterprises. Applicants are required to have an adequate background in the humanities and/or social sciences as they apply to the understanding of American studies.

Required: the general requirements stated under Columbian School of Arts and Sciences and successful completion of a reading knowledge examination in an approved foreign language. All students must take AmSt 271 and a research seminar approved by the advisor. Candidates must pass a General Examination in four areas within three years of matriculation. Four fields are elected with approval of the advisory committee; one field may represent foreign coverage. Other areas may be chosen from: American diplomatic, economic, political, social, cultural, or urban history; folklife; literature; philosophy; or religion; popular culture; cultural theory; mass media; race studies; African American or women's gender history; historic preservation; or some area in the social and behavioral sciences. In affiliation with the Smithsonian Institution, special topics include aerospace history, decorative arts, ethnohistory, history of science, [illegible]

of technology, industrial archaeology, material aspects of American civilization, and various fields in the history of art. Additional areas of study may be arranged within the University and in both the Library of Congress and the Smithsonian. Special announcements concerning these programs are issued periodically and are available in the office of the Director of the American Studies Program.

Research fields for the dissertation may be chosen from any of the above except those dealing with the culture of an area outside the United States.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

213 **Mesoamerican Field Program** (3 or 6) Staff
Same as Anth/Geog 213. (Summer)

220 **Fundamentals of Feminist Theory** (3) Palmer
Same as WStu 220

225 **History of Washington, D.C.** (3) Gillette
The social history of Washington, from village to metropolis, with emphasis through field trips on the evolution of residential neighborhoods and related issues of historic preservation and conservation. Same as Hist 225. (Spring)

256 **Folklore Theory** (3) Vlach
An intellectual history of American folklore research, analysis of particular theories and methods. Same as Anth 256. (Spring)

257 **Seminar: American Folklife** (3) Vlach
Research and discussion on the traditional cultures of various geographical regions of the United States. Analysis of folk art, craft, and architecture, regional and ethnic identities. Same as Anth 257. (Fall)

259 **Topics in American Folklife** (3) Staff
A seminar devoted to a variety of subjects related to folklore and folklife, such as public folklore policy, folk music, or ethnic folklore and culture. Specific topic to be determined by the interests of available faculty and the needs of the folklife program. Same as Anth 259.

270 **Theory and Practice of Public History** (3) Horton
Theoretical and practical dimensions of public history, as illustrated by recent controversies surrounding public exhibitions and debates on revisionist history as well as more traditional means of presenting the past in public forums. Same as Hist 270.

271 **Seminar: Scope and Methods in American Studies** (3) Murphy, Gillette, Mergen
Consideration of American studies as an area for research and teaching; introduction to bibliography. Required of candidates for the degree of Master of Arts in the field of American civilization. (Fall)

272 **Cultural Theory and American Studies** (3) Gillette, Mergen, McAlister
Major issues in critical and cultural theory as they relate to American culture. Various interpretive approaches including discourse analysis, cultural studies, new historicism, anthropological theory, etc. Prerequisite: AmSt 271. (Spring, alternate years)

274 **Studies in Early American Culture** (3) Seavey
Same as Engl 223.

275 **The Politics of Historic Preservation** (3) Staff
Overview of the political issues, forces, events, and players that have shaped contemporary preservation practice, with an emphasis on public policy issues that have not been resolved and continue to confront preservation objectives. Prerequisite: Permission of instructor. (Spring)

276 **Economics of Preservation** (3) Wagner
Analysis of economic techniques and benefits used to encourage the retention and reuse of historic buildings and districts in the United States. Emphasis on revitalization of older commercial centers and the Mainstreet program. Prerequisite: Permission of instructor. (Spring)

277–78 **Historic Preservation: Principles and Methods** (3–3) Longstreth
The scope and purpose of the preservation movement in the United States, with focus on developments since the 1960s. Preservation theories, attitudes toward the past and toward design, the intent and impact of legislation, approaches to documentation, the concept of significance, and preservation as an instrument of change. Same as Hist 277–78. (Academic year)

280 **Field Methods in Architectural Documentation** (3) Rident
In-depth thematic examination of cultural landscape, focusing on field techniques for recording, analysis, and interpretation of historic properties. Work at field sites is supplemented by lectures, discussion, and readings. (Fall)

282 **Seminar in American Architecture** (3) Longstreth
Advanced research problems addressing artistic, cultural, social, technical and urbanistic aspects of American architecture in the 19th and 20th centuries. Topics vary. Prerequisite: AmSt 175 or 176 or equivalent, or permission of instructor. (Spring, alternate years)

286 **Interpretation in the Historic House Museum** (3) Stapp
Same as Educ 286.

289–90 **Seminar: Topics in American Civilization** (3–3) Staff
Research problems selected by the instructor. Preparation in American cultural history or other area appropriate to the topic of the seminar. (Academic year)

294 **Archaeology Field/Laboratory Research** (3) Cressey, Brook-
Same as Anth 294. Staff

295 **Independent Study** (arr.)
Limited to master's candidates. Written permission of instructor required. Staff

299–300 **Thesis Research** (3–3) Vlach

351 **Vernacular Architecture** (3)
Examination of selected regional and ethnic traditions in American building. Survey and field techniques and use of documentary sources. (Spring, alternate years)

379 **Readings in American Cultural History** (3) Mergen, Gillette, Murphy
Major issues in the cultural and intellectual history of the United States. Analysis of verbal and written forms of expression to assess the impact of economic development and race and gender relations on American society. (Fall, alternate years)

380 **Research in American Cultural History** (3)
Research on selected topics in the cultural and intellectual history of the United States. Prerequisite: AmSt 379. (Spring, alternate years) Staff

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Staff

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

Courses Offered in Affiliation with the Smithsonian Institution

Columbian School of Arts and Sciences is affiliated with the Smithsonian Institution Program for Graduate Students in the History of American Civilization. The following courses are offered at the National Museum of American History and at the National Portrait Gallery by members of their staffs.

250 **American Material Culture** (3) Mergen, Mar-
Familiarization with the historical collections of the Smithsonian Institution and introduction to opportunities for research and publication based on historical objects. Required of all students in the master's and doctoral programs affiliated with the Smithsonian Institution. (Fall)

251 **Museum Research and Education** (3) Ayre-
Supervised work and/or study under the direction of Smithsonian staff members and research associates—examples of topics are museum visitor behavior, costumes and furnishings, decorative arts, and photography as historical documentation. (Fall and spring)

252–53 **American Decorative Arts** (3–3) Carson
Concepts of visual recognition and evaluation of surviving domestic artifacts from the 17th, 18th, and 19th centuries, including those made of wood, clay, glass, metal, and cloth. AmSt 252 is prerequisite to AmSt 253. (Academic year)

284 **Seminar: Studies in American Art and History** (3) Mergen
Joint offering of the American Studies Program and the Art Department. Examination of selected problems and themes in American cultural history focusing on the use of artistic materials in different media; emphasis on methodology and analytic techniques. May be repeated for credit.

285 **Technology, Labor, and American Society** (3) Staff
Selected readings on the interrelations among technology, labor, and society in the United States.

394 **Advanced Reading and Research** (ART.)
Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Smithsonian Institution. May be repeated for credit.

395 **Dissertation Research** (ART.)
For Doctor of Philosophy candidates preparing dissertations significantly related to the material aspects of American civilization. Students work under curatorial supervision at the Smithsonian Institution. May be repeated for credit.

ANATOMY AND CELL BIOLOGY

The Department of Anatomy and Cell Biology offers the courses listed below in support of basic science programs offered by Columbian School of Arts and Sciences.

Departmental prerequisite: Faculty approval is required for all courses.

204 **Neuroanatomy** (2) Peusner
Gross and microscopic anatomy of central nervous system and special senses. Laboratory fee, $13.

210–11 **Gross Anatomy** (2–3) Slaby, Bohn
Regional dissections of adult cadaver supplemented with lectures and X-rays.

212 **Neurobiology** (3) Bohn
An integrated survey of the structure and function of the human nervous system, lecture, clinical demonstration, and laboratory. Laboratory fee, $25.

214 **Human Microscopic Anatomy** (3) Koering, Krum
Microscopic structure of cells, tissues, and organs of the human body.

221–22 **Special Topics in Anatomy and Cell Biology** (1 to 3) Staff
Presentations, discussions, and student-oriented projects that have as their theme a particular subspecialty of anatomy or cell biology.

252 **Human Variation** (1) Ubelaker
Same as Anth 146.

253 **Current Topics in Developmental Biology and Genetics** (1 to 3) Moody, Huang
Recent advances in developmental biology and developmental genetics presented by students and faculty. May be repeated for credit.

260 **Electron Microscopy in Cellular Biology** (3) Koering
Introduction to the morphology of the cell, utilizing current laboratory protocols. Admission by permission of instructor. Laboratory fee, $25.

276 **Advanced Studies in Anatomy** (1) Staff
Lectures and conferences on selected anatomical subspecialties—endocrinology, teratology, growth, and others. May be repeated for credit.

277 **Special Topics in Neurobiology** (1 to 3) Staff
Selected topics regarding the structural and functional organization of the nervous system. May be repeated for credit.

279 **Applied Regional Anatomy** (1 to 3) Bohn, Slaby
Regional dissection, assigned readings, discussion.

ANTHROPOLOGY

Professors R.M. Krulfeld, R.L. Humphrey, A.S. Brooks, C.J. Allen (*Chair*), J.M. Vlach, J. Gow, B. Wood, X.-Q. Shao (*Research*), R. Rohrlich (*Research*)
Adjunct Professor G. Brana-Shute
Professorial Lecturers D.H. Ubelaker, S. Hertz, R. Potts, G. Teleki
Associate Professors J.C. Kuipers, B.D. Miller, R.R. Grinker, I.R. Wedel (*Research*)
Adjunct Associate Professors C.R. Rose, P.J. Cressey, N.L. Benco
Associate Professorial Lecturers D.W. von Endt, J. Love
Assistant Professorial Lecturers J.P. Homiak, J. Brady, P. Stanbury, D. Groenfeldt

Master of Arts in the field of anthropology—Prerequisite: a bachelor's degree, a major in anthropology is preferred but not mandatory. The undergraduate program should have included courses above the introductory level in anthropological theory, social organization, linguistics, archaeology, and biological anthropology. Students with less background

in anthropology may be admitted but may be required to take one or more undergraduate courses to make up deficiencies before beginning the degree program.

1. *General degree*—Required: the general requirements stated under Columbian School of Arts and Sciences. The minimum requirement consists of 24 credit hours of approved graduate course work, generally followed by a thesis (Anth 299–300). Under certain circumstances, however, the department may permit a program of study consisting of 30 credit hours of approved course work without a thesis. At least 6 credit hours drawn from the sequence Anth 201, 202, 203, 204 should be included in the program of study and should be completed during the first 24 credit hours of graduate course work. For students with fewer than four undergraduate semesters of one major foreign language, a reading knowledge examination in a major foreign language must be passed before beginning the third semester of graduate work. All students must pass a general Master's Comprehensive Examination.

2. *With a concentration in museum training*—Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study is the same as that described for the general degree, above, with the following exceptions: the minimum requirement consists of 36 credit hours of approved graduate course work and must include from 12 to 15 credit hours of work in museum-related courses, 6 credit hours of which may be in an internship. Museum training students may substitute for the foreign-language reading examination an appropriate course in chemistry or photography, approved by the department. No thesis is required, but students are expected to submit to the department at least one research paper of publishable quality on a museum-related topic. Students whose primary interest is in museum techniques, rather than anthropology, are advised to apply to the master's program in museum studies (see Museum Studies). A program in museum education is also available through the Graduate School of Education and Human Development.

3. *With a concentration in folklife*—Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study is the same as that described for the general degree, except that 6 hours of folklore core courses (Anth/Am S 256 and 257) are also required.

4. *With a concentration in development*—Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study is the same as that described above for the general degree, with the following exceptions: this is a 60-credit-hour nonthesis program, including 9 hours in development anthropology (chosen from Anth 220, 221, 222, 223), 18–21 hours in other anthropology courses, and at least one graduate-level economics course. In some circumstances a thesis may be allowed. The program is designed to improve the student's understanding of development problems such as economic change, population, health, education, migration, and ecology, within an anthropological framework. Internships at public and private development agencies in the Washington area are encouraged. A program in international development studies with a disciplinary specialization in anthropology is offered by the Elliott School of International Affairs.

Master of Science and Doctor of Philosophy in the field of geobiology—see Geology.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Program Bulletin for course listings.

201 **Biological Anthropology** (3)
Theories, methods, and current issues in the various subdisciplines of biological anthropology. (Spring) Brooks, Bush

202 **Sociocultural Anthropology** (3)
Major topics in contemporary social and cultural anthropology, stressing current journal and monograph materials. (Spring) Kraulfeld, Alles, Kingsolver

203 **Linguistic Anthropology** (3)
Contemporary anthropological studies of language in biological, social, and cultural perspectives. (Fall) Basso

204 **Method and Theory in Archaeology** (3)
Survey of the most recent archaeological techniques and theoretical approaches to reconstructing and interpreting the cultures of the past. (Fall) Sabo

211 **Problems in Conservation** (3)
Joint offering of the Anthropology and Art Departments. Individual examination projects to determine composition, construction, decomposition, and

als, and possible stabilization techniques. Conservation laboratory experience. Prerequisite or concurrent registration: Art or Anth 212. (Fall)

212 **Advanced Conservation Techniques** (3) von Endt
Joint offering of the Anthropology and Art Departments. Physical structure, molecular biology, and chemistry of ethnographic materials. Chemistry and physics underlying techniques used to conserve these materials. Prerequisite: Art or Anth 293, Chem 50, and permission of instructor. Laboratory fee, $25. (Fall)

213 **Mesoamerican Field Program** (3 or 6) Brady
Same as AmSt/Geog 213. (Summer)

214 **Paleoanthropological Field Program** (3 or 6) Brooks, Shao
Intensive course on field research in paleoanthropology, including excavation methods, identification and analysis of materials, paleoecology, archaeology, and human anatomy. Conducted at selected sites in Eurasia, Africa, or Australia. Visits to comparative sites and collections in the region. (Summer)

220 **The Anthropology of Development** (3) Miller, Gow
Theoretical perspectives that distinguish the contribution of anthropology to understanding processes of change in the Third World. Focus on health, population, environment, gender, and tourism issues. The role of anthropology in planning and implementing projects and policy. (Fall)

221 **Key Variables in Development** (3) Miller and Staff
Major factors required for understanding planned and unplanned social change in the areas of population, education, land reform, women's status, technology, forestry, nutrition, health care, and migration and resettlement. Study of the major variables and processes in each area to aid in successful planning, implementation, and evaluation of projects. (Spring, alternate years)

222 **Issues in Development** (3) Miller, Gow
Topic to be announced in the *Schedule of Classes*.

223 **Research Methods in Development Anthropology** (3) Miller, Gow
Anthropologists' roles in multidisciplinary teams, including research-related activities, such as feasibility studies, social soundness analysis, and evaluations. Innovative research techniques, such as interactive data gathering, team survey methods, and rapid rural appraisal. Admission by permission of instructor. (Spring)

224 **Internship in Development Anthropology (3)** Miller, Gow
Supervised participation in a selected development agency or other relevant organization. Opportunity to observe agency procedures and gain practical experience. Admission by permission of instructor or department chair. May be repeated for credit. (Fall and spring)

247 **Paleoanthropology** (3) Brooks, Wood
Survey of current research in hominid and hominoid evolution, focusing on the integrated nature of the field. Contributions from the geological and biological sciences will be stressed, together with innovative geochemical techniques for establishing chronological sequences. Prerequisite: Anth 147 or BiSc 150 or equivalent. (Fall, odd years)

256 **Folklore Theory** (3) Vlach
Same as AmSt 256.

257 **American Folklife (3)** Vlach
Same as AmSt 257

258 **Anthropology of Art, Aesthetics, and Symbolism** (3) Allen
Anthropological approaches to aesthetic problems and theories of symbolism in the context of ethnographic materials. (Fall)

259 **Topics in American Folklife (3)** Staff
Same as AmSt 259

260 **Anthropology and Contemporary Problems** (3) Kruiteld and Staff
Exploration of anthropological perspectives on a current issue or issues such as refugees, natural disasters, homelessness, drug abuse, ecological and cultural conservation, etc. Specific topic announced in the *Schedule of Classes*.

261 **The Politics of Culture** (3) Kuipers and Staff
Use of literary and philosophical models of culture as text and practice to examine various forms of cultural representations, including museums, ethnographies, folkloric events, and novels.

262 **Medical Anthropology** (3) Miller
Concepts of medical anthropology, including the cultural construction of illness, the somatic expression of distress, and ethnopsychiatries; "critical" versus "conventional" medical anthropology. (Fall)

263 **Nationalism and Ethnicity** (3) Grinker, Krulfeld
Major theoretical and ethnographic issues in the study of nationalism worldwide. Explores how ethnic groups emerge in colonial and contemporary plural societies and how states attempt to integrate ethnic groups into nations. (Fall)

266 **Technology** (3) Bens
Cross-cultural examination of the form, function, meaning, and use of material culture and the behavior patterns involved in its production. Topic announced in the *Schedule of Classes.* (Spring, alternate years)

267 **Economic Anthropology** (3) Krulfeld, Grinker
Comparative study of systems of production, distribution, consumption, political economy and economic change in both preliterate and complex societies.

268 **Peasant Society** (3) Kr
Cross-cultural analysis of peasant societies, including their manner of functioning within larger social, economic, and cultural contexts. (Fall)

269 **Gender and Sexuality** (3) Miller and Staff
Study of new theoretical and methodological approaches developed in the anthropology of gender. Topics include colonialism, orientalism, sexuality, and literary representations of gender. (Fall, odd years)

272 **Anthropology of Latin America** (3) Allen and Staff
Intensive study of a selected topic in the anthropology of Central and/or South America. Topic to be announced.

282 **Advanced Archaeology—New World Prehistory** (3) Humphrey and Staff
Current archaeological problems relating to the origin and development of aboriginal cultures. Specific topic to be announced in the *Schedule of Classes.* May be repeated for credit.

283 **Old World Anthropology—**
Physical Anthropology and Archaeology (3) Bens
Current problems in relation to materials from the Old World. Specific topic to be announced in the *Schedule of Classes.* (Spring) Staff

290 **Advanced Museum Research** (3)
Supervised individual research and/or field work at the Smithsonian Institution or other area museums, arranged in consultation with the museum and the Anthropology Department. Admission by permission of the department chair. May be repeated for credit. (Fall and spring)

291 **Anthropology in the Museum** (3) Humphrey and Staff
Anthropological materials (in the broadest sense), exhibits, and museums. Topics include museum anthropology, collections, research, interpretation, and education, with a focus on the practical problems of developing an anthropological exhibit hall. (Spring) Staff

292 **Introduction to Conservation** (3) Staff
Same as Art 292

293 **Preventive Conservation Techniques** (3)
Same as Art 293 Crosser, Staff

294 **Archaeology Field/Laboratory Research** (3)
Same as AmSt 294. Field and/or laboratory techniques and interpretation. Topics may include excavation methods, recording, photography, conservation, stratigraphy, environmental reconstruction, typology, ceramic analysis, use-wear analysis, spatial analysis, faunal analysis, provenance studies, and dating. May be repeated for credit. (Spring, odd years, and summer) Staff

295 **Research** (arr.) Staff
May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

APPLIED SCIENCE

Interdepartmental course offerings in the School of Engineering and Applied Science

211 **Analytical Methods in Engineering I** (3) Staff
Engineering applications of the theory of complex variables: contour integration, conformal mapping, inversion integral, and boundary-value problems. Prerequisite: approval of department. (Fall)

212 **Analytical Methods in Engineering II** (3) Mavriplis
Algebraic methods appropriate to the solution of engineering computational problems: linear vector spaces, matrices, systems of linear equations, eigenvalues and eigenvectors, quadratic forms. Prerequisite: approval of department. (Spring)

213 **Analytical Methods in Engineering III** (3) Staff
Analytical techniques for solution of boundary-initial-value problems in engineering: wave propagation, diffusion processes, and potential distributions. Prerequisite: approval of department. (Fall)

214 **Analytical Methods in Engineering IV** (3) Staff
Introduction to variational methods in engineering: Ritz and Galerkin approximation methods of boundary-value problems, aspects of linear integral equations arising from engineering analysis. Prerequisite: approval of department. (Spring, even years)

215 **Analytical Methods in Engineering V** (3) Staff
Advanced methods of solution of boundary-initial-value problems in engineering characteristics, wave propagation, and Green's functions. Prerequisite: ApSc 214. (Fall, odd years)

216 **Special Topics in Engineering Analysis** (3) Staff
Selected topics, such as perturbation techniques applied to approximate solution of nonlinear boundary and initial-value problems in engineering; application of singular integral equations in problems of mechanics. Prerequisite: approval of department. (As arranged)

ART

Professors L.F. Robinson (*Chair*), J.F. Wright, Jr., J.L. Lake, T. Ozdogan, M.P. Lader, C.C. Costigan, J.C. Anderson, W.T. Woodward, B. von Barghahn
Associate Professors H.I. Gates, D.M. Hitchcock, S.B. Molina, J.L. Stephanie, K.J. Hartwick, D. Bjelajac
Adjunct Associate Professor C.R. Rose
Associate Professorial Lecturers A.B. Barnhart, B.G. Carson, L.D. Miller, J.F. Harrop, Jr.
Assistant Professor P. Jacks
Assistant Professorial Lecturers M.J. Francis, B.R. Stevens, R. Rodriguez, J.R. Spencer, M. Hashem, R. Ghezzi, P. Pagratis, P. Wright

Master of Arts in the field of art history—Prerequisite: a Bachelor of Arts degree with a major in art history from this University, or an equivalent degree.

1. With a *concentration in classical art and archaeology, medieval art, Renaissance art, Baroque art, eighteenth- and nineteenth-century art, contemporary art, or American art*—Required: the general requirements stated under Columbian School of Arts and Sciences, 36 credit hours of course work including 6 hours of thesis research. As many as [illegible] hours may be taken in museum-related courses. Students are required to take a seminar in each of the following areas: classical, medieval, Renaissance, Baroque, modern, and American. A reading knowledge examination in German or French must be passed before completion of the first 9 credit hours of course work. A Master's Comprehensive Examination must be passed before students can enroll for the 6 credit hours of thesis research. A written thesis must be submitted to and approved by the faculty.

2. With a *concentration in museum training*—Required: the general requirements stated under Columbian School of Arts and Sciences, 36 credit hours of course work, including [illegible] hours of internship credit (Art 201.2 and 271–72). As many as possible of the 36 hours of course work should be in third group courses. Students are required to take a seminar in each of the following areas: classical, medieval, Renaissance, Baroque, modern, and

American. Six hours of electives in art history or in museum-related courses are selected in consultation with the graduate advisor. A reading knowledge examination in German or French must be passed before completion of the first 9 credit hours of course work. Students are required to pass the Master's Comprehensive Examination in art history.

Acceptance into this program as a degree candidate is provisional, pending satisfactory completion of 12 credit hours of graduate art history courses.

The Art Department has established a program of study in affiliation with a number of museums and galleries including the Corcoran Gallery of Art, Hirshhorn Museum and Sculpture Garden, Museum of African Art, National Museum of American Art, National Museum of Women in the Arts, Phillips Collection, Renwick Gallery, and Textile Museum.

Programs specific to museum studies and museum education are also available.

Master of Fine Arts in the field of ceramics, design, printmaking, painting, photography, sculpture, or visual communication—Prerequisite: a Bachelor of Fine Arts or a Bachelor of Arts degree with a major in fine arts in the field of ceramics, design, drawing, painting, photography, printmaking, sculpture, or visual communication. A 3.0 undergraduate grade-point average (on a 4.0 scale) and departmental approval of the applicant's work are required. This should consist of slide examples of work in the area of application, as well as slides of representative works in other areas. Applicants to the photography program should submit photographic works only. Applicants to the printmaking program should submit slides of work in the four primary areas of the discipline as well as 15 examples of drawings, 10 of which should be figure from life. Students planning to do graduate work in printmaking or painting must have completed 12 credit hours of drawing at the undergraduate level before admittance to the master's program.

Required: the general requirements stated under Columbian School of Arts and Sciences. A minimum of 45 credit hours of course work in fine arts is required; the nature of required hours and their distribution are determined in consultation with an advisor. As much as possible of the course work should be in third group courses. A creative thesis consisting of the execution of original works of art in ceramics, design, drawing, painting, photography, printmaking, sculpture, or visual communication will be completed under the supervision of a thesis advisor. In addition, the thesis must include a written statement and analysis of artistic purpose, subject to the approval of the thesis advisor and a second faculty reader. A representative portion of the work illustrating the thesis may be returned by the University at the discretion of the thesis director in agreement with the second reader.

Doctor of Philosophy in the field of art history—Required: the general requirements stated under Columbian School of Arts and Sciences, and a Master of Arts degree in art history. Candidates must also pass written examinations in French and German and General Examinations in one major area of specialization and two other areas of specialization. Language examinations should be completed within the first academic year of course work. Programs are planned in consultation with a departmental committee.

Research fields: Nineteenth- and twentieth-century European art, American art, and Spanish art.

Supporting fields: Classical art and archaeology, early Christian and Byzantine art, Northern Renaissance art, Baroque art, and other fields as appropriate.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Program Bulletin for course listings.

ART HISTORY

203 Topics in Iberian and Colonial Art of South America (3) von Barghahn
Topics announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

211 Problems in Conservation (3) Vitale
Same as Anth 211.

212 Advanced Conservation Techniques (3)
Same as Anth 212.

220 Seminar: Baroque Art of the 17th Century (3) Hitchcock, von Barghahn
A reading knowledge of Italian is desirable for the Italian area and German for the northern area. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

221 **Seminar: Renaissance Art** (3) Staff
A reading knowledge of French, German, or Italian is desirable, depending on the specific area. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

243 **Seminar: American Art** (3) Bjelajac
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

244 **Seminar: 19th-Century European Art** (3) Robinson
Reading knowledge of French desirable. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

245 **Seminar: 20th-Century European Art** (3) Lader
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

246 **Seminar: Classical Art** (3) Hartswick
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

247 **Proseminar: Medieval Art and Archaeology** (3) Anderson
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

248 **Independent Research in Art History** (3)

261 **Seminar: Problems in Art History** (3) Staff
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

284 **Seminar: Studies in American Art and History (3)** Staff
Joint offering of the Art Department and the American Studies Program in affiliation with the National Portrait Gallery of the Smithsonian Institution. Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. (Spring)

285 **Museum Internship** (1 to 12) Staff
Open only to candidates for the degree of Master of Arts in the field of art history with a concentration in museum training.

289–90 **Thesis Research** (3–3)

292 **Introduction to Conservation** (3) Rose
Same as Anth 292. Method and theory of conservation, including fine arts, ethnographic, archaeological, and monuments conservation; handling, restoration, preservation, storage, and display of museum specimens; materials and environmental reactions of ethnographic objects. (Fall, spring, and summer)

293 **Preventive Conservation Techniques (3)** Rose
Same as Anth 293. Preventive conservation: monitoring environmental conditions, examining objects and documenting their state, and identifying sources of deterioration. Students conduct tests, evaluate exhibition and storage areas, and help to improve museum conditions. Prerequisite: Anth/Art 292.

385–86 **Readings in Art History (3–3)**
Enrollment limited to doctoral candidates.

398 **Advanced Reading and Research** (arr.)
For students preparing for the doctoral examination.

399 **Dissertation Research** (arr.)

FINE ARTS

Note: All fine arts courses may be repeated for credit with approval of the department. Schedule of fees for Art 248 and 289–300: Ceramics—$75; 2-D Design—$24; 3-D Design—$75; Drawing—$75; Printmaking—$54; Sculpture—$35; Typography—$75; Oil and Acrylic Painting—none; Watercolor—$45; Photography—$100; Visual Communication—$75; Lithography—$54; Serigraphy—$75; Jewelry Design—$36.

295 **Advanced Photography: Zone System Tests (3 or 4)** Lake
Tone control through exposure development tests. Completion of laboratory manual required. Prerequisite: Art 181 and 182 or permission of instructor. Laboratory fee: $100. (Fall and spring)

296 **Advanced Photography: Color Printing and Zone Proofs** (3 or 4) Lake
Printing from color negatives. Correct color balancing and creative color shifts will be explored. Development of portfolio of prints utilizing approved theme

and the exposure and development times established in Art 205. Prerequisite Art 181 or 205, as determined by instructor. Laboratory fee, $100. (Fall and spring)

208 **Advanced Photography: Special Projects** (4) Lake
Independent projects requiring approval prior to registration. Prerequisite Art 181 and 182, or permission of instructor. Laboratory fee, $100. (Fall and spring)

209 **Exhibition and Display Design** (3) Miller

224 **Advanced Ceramic Sculpture** (3) Ozdogan
Continuation of Art 152 with emphasis on individual approach. Exploration of mixed media and mold casting. Laboratory fee, $75. (Fall)

225 **Advanced Ceramic Decoration** (3) Ozdogan
Perfection of decorating techniques. Students establish style through independent exploration. Laboratory fee, $75. (Spring)

226 **Architectural Ceramics** (3) Ozdogan
Advanced studies in ceramic murals and sculptures designed for indoor and outdoor architectural concepts. Laboratory tests and activities. Laboratory fee, $75. (Spring)

231–32 **Design III** (3–3) Gatz
New media and techniques in three-dimensional design. Laboratory fee, $27 per semester. (Academic year)

235 **Design V: Textile Printing** (3) Staff
Designing and executing textiles using the techniques of silk screen, block print and batik. Laboratory fee, $24. (Fall and spring)

248 **Independent Research in Fine Arts** (3) Staff
For master's degree candidates; open to limited number of qualified undergraduates, with permission. Independent research arranged in consultation with individual instructor and graduate advisor. May be repeated for credit. Laboratory fee depending on area chosen. (Fall and spring)

249 **Theory and Practice** (3) Castrodale
Stimulation and articulation of personal creativity and critical and presentational skills. Emphasis on visual diaries, problems of individual artistic production, and peer interaction on issues in contemporary art and design. Recommended for graduate students in all areas before the thesis and for seniors majors with permission of instructor. Laboratory fee, $24.

251 **Advanced Ceramic Design in Wheel Throwing** (3) Ozdogan
Individual projects on the potter's wheel. Student establishes personal style and direction and perfects skills. Either pottery or sculptural approaches encouraged. Research in clays, glazes, and firings is required. Laboratory fee, $75. (Fall and spring)

252 **Advanced Ceramic Design in Hand Building** (3) Ozdogan
Individual projects in hand building. Student establishes style and direction and perfects skills. Either pottery or sculptural approaches encouraged. Research in clays and glazes is required. Laboratory fee, $75. (Fall and spring)

253 **Industrial Ceramic Design/Mold Making** (3) Ozdogan
Study in the multiple production process from model making to finished duplicate form as it exists on factory level. Methods include all aspects of slip designing and making in clay and plaster, mold making in plaster, production methods from molds including press molding, slip casting, jiggering, and pressing. Laboratory fee, $75. (Fall and spring)

254 **Advanced Ceramic Technology** (3) Staff
A thorough investigation of specific ceramic materials, clay bodies, and glazes with an emphasis on formulation, alteration, and firing. Prerequisite Art 151, or approval of instructor. Laboratory fee, $75.

255–56 **Printmaking: Advanced Serigraphy** (3–3) Staff
Utilization of principles and techniques of serigraphy toward development of personal statement and style. Prerequisite: Art 143–44. Laboratory fee, $75 per semester. (Academic year)

257–58 **Printmaking: Etching and Engraving** (3–3) Staff
Advanced problems in etching and engraving, including composite processes, light-sensitive grounds, mixed media, and theoretical and practical problems in color prints. Laboratory fee, $54. (Fall and spring)

259 **Printmaking: Advanced Lithography** (3) Barnhart
Individual problems in lithography related to printing images from stones and metal litho plates. Prints in crayon, tonal washes, and multicolor. Emphasis on mastering the lithographic process and developing a personal statement and style. Laboratory fee, $54.

260 **Printmaking: Relief Printing** (3) Staff
Advanced problems, practical and theoretical, in woodcut, wood engraving, collograph, composite techniques, and mixed media in monochrome and color. Laboratory fee, $54. (Fall and spring)

265–66 **Painting IV** (3–3) Woodward
Alternatives in pictorial dynamics. Assigned studio and independent problems in alla prima and mixed techniques. Material and model fee, $45 per semester. (Academic year)

267–68 **Individual Problems in Photography** (4–4) Staff
Limited to M.F.A. candidates and qualified undergraduates. Prerequisite: Permission of instructor and approval of project prior to registration. May be repeated for credit. Laboratory fee, $100 per semester. (Academic year)

275 **Painting V** (3) Woodward
Development of personal imagery. Individual problems and critiques. Material and model fee, $45.

277 **Advanced Visual Communication: Packaging Design and Illustration** (3) Molina
Advanced studio projects. May be repeated for credit provided the content differs. Laboratory fee, $100. (Fall and spring)

278 **Advanced Visual Communication: Problem Solving and Applied Design** (3) Molina
Advanced studio projects. May be repeated for credit provided the content differs. Laboratory fee, $100. (Fall and spring)

279–80 **Sculpture IV** (3–3) Gates
Advanced study aimed at development of concept and style. Prerequisite: permission of instructor. Laboratory fee, $35. (Academic year)

281 **Sculpture V** (3) Gates
Emphasis on individual sculptural concepts and materials. Prerequisite: permission of instructor. Laboratory fee, $35. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
Laboratory fee depending on area chosen.

ART THERAPY

Adjunct Associate Professor E. Kramer
Assistant Professors K.J. Williams (*Director*), C.T. Cox
Adjunct Assistant Professors W. Manorana, A.J. Di Maria, B. Sobol
Clinical Instructors A.L. Wollman, P. Prugh, V. Tarpley, J. Couch, T. Councill, C. Boston
Lecturers B. Barthell, P. Howie, D. Brancheau, T. Tripp

Master of Arts in the field of art therapy—Prerequisite: a bachelor's degree, evidence of adequate training and/or experience in art, including painting, drawing, and clay modeling, course work in the behavioral and/or social sciences, including personality theory, abnormal psychology, and child psychology.

Required: the general requirements stated under Columbian School of Arts and Sciences and successful completion of 42 credit hours of graduate course work. At least 24 credit hours must be in art therapy and must include ArTh 201, 203, 205–6 or 207 and 208, 224, 226, 283–84, and 293–94.

Specific emphasis: adult art therapy, family art therapy, child art therapy, and research.

Students wishing to extend their training to the doctoral level are encouraged to apply to the Doctor of Psychology program. See Professional Psychology.

Five-Year *Bachelor of Arts/Master of Arts in the field of art therapy*—See the Undergraduate Programs Bulletin.

201 **Introduction to Art Therapy** (3) Brancheau
Lectures, presentation of illustrative case material, class discussion of assigned readings, fieldwork. Survey covering range of art therapy practice, personality assessment and treatment approaches, historical development, main theoretical trends. Open only to art therapy degree candidates. (Fall)

202 **Case Studies in Art Therapy** (3) Di Maria
Discussion of case material provided by students in order to refine methods of working and to improve written and oral reports. Instructor and other practitioners may provide supplementary illustrative material. Assigned reading. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Spring)

203 **Technique of Art Therapy** (3) Barthell
Art therapy approaches with individuals and groups of different diagnostic categories in various settings presented through illustrative clinical examples. Students experiment with numerous techniques through the use of art materials. Open only to art therapy degree candidates. (Fall)

204 **Psychodynamic Processes in Art Therapy** (3) Kramer
Concepts of instinctual drives; ego development; mechanisms of defense; sublimation; transference and countertransference; maturation and regression; applied to work with children, adults, families, and groups. (Spring)

205–6 **Family Art Techniques** (3–3) Sabo
Principles of work with families, with emphasis on the use of art techniques for evaluation of family dynamics. The major focus is on opportunities to conduct and observe family art evaluations. Enrollment is limited to 12. Prerequisite: ArTh 201, 203. Open to art therapy degree candidates only. (Fall and spring)

207 **Art as Therapy with Children** (3) Di Maria
Introduction to the practical and theoretical considerations involved in art as therapy with children. Focus on psychodynamics, artistic developmental stages, methods of child art evaluation, and basic issues in therapeutic guidance of the child. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Fall) Cox

208 **Art Therapy with Adolescents** (3)
Theoretical and practical issues in art therapy with adolescents in educational and clinical settings. Experiential work in art techniques appropriate to this population. Class discussion of readings on adolescent development. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Spring) Staff

211 **Survey of Art Therapy** (3)
Use of visual arts to enhance personal development, history, theories, range of practice in art therapy. Illustrated lectures, reading, discussion, studio work. Not intended for art therapy degree candidates. Open to advanced undergraduates with permission of instructor. (Fall)

220 **Research Techniques in Art Therapy** (3)
Seminar on research principles, design, and methodology specifically related to art therapy. Development of individually designed art therapy pilot studies. (Fall) Williams

224 **Process of Art Therapy** (3)
Exploration of the treatment process through discussion of literature in art therapy and related fields. Several critical papers will be required. (Fall) Williams

226 **Process of Art Therapy** (3)
Exploration of the treatment process through rehearsal of fundamental ways of being a therapist and presentation of case material from field experience. Videotaping and audiotaping required. (Spring)

228 **Art and Diagnosis** (3)
Review of the *Diagnostic and Statistical Manual* with emphasis on viewing art productions by specific diagnostic populations. Focus on relevant art therapy research that aids in diagnosis. (Fall)

275 **Group Art Therapy** (3)
Experience as participant, observer, and leader in an art-centered group. Required reading; theory of group process. Open to art therapy master's degree candidates and others with permission of instructor. (Summer)

280 **Assessment Procedures for Art Therapists** (3)
Focus on assessment procedures used in clinical settings, with an emphasis on assessment by graphic means. Develop ability to analyze form and content of pictorial and sculptural work for clinical and diagnostic purposes. (Fall)

283–84 **Practicum in Art Therapy** (1–2)
Staff
The sequence of ArTh 283–84 and 293–94 requires a minimum of 1100 hours of fieldwork connected with service to clients. On-site individual supervision is supplemented with group supervision by departmental staff. Prerequisite: ArTh 201 and 203. Open only to art therapy degree candidates.

285 **Special Projects in Art Therapy** (arr.)
Staff
Individual work based on research, empirical, clinical, and library research may be undertaken, as well as the development of new procedures. Details to be worked out with each student. May be repeated for credit with advisor's approval. Open only to degree candidates. (Fall and spring)

289 **Special Topics** (1 to 3)
Staff
Connections between art therapy and other disciplines; new developments in the field. May be repeated for credit with approval of advisor. Open to art therapy degree candidates and others with permission of instructor.

290 **Workshops in Art Therapy** (3)
Staff
Art therapists and other mental health professionals will conduct four weekend workshops during the semester. Emphasis on the elucidation of concepts of treatment through lectures, discussion, and participation. (Fall)

293–94 **Practicum in Art Therapy** (2–1)
Staff
Continuation of ArTh 283–84.

298 **Reading and Research** (1 to 3)
Staff

BIOCHEMISTRY AND MOLECULAR BIOLOGY

Professors I.M. Bailey, A.L. Goldstein (*Chair*), L.L. Gallo, A. Kumar, G. Walker, J.Y. Vanderhoek, W.H. Burgess, K.C. Ingham, D.K. Strickland
Associate Professors V. Hu, J.A. Winkles
Assistant Professors C.J. Bieberich, H. Lubon, D. Mann

Master of Science in the field of biochemistry—Prerequisite: a bachelor's degree. The undergraduate program must have included the following courses, or equivalent: BiSc 11–12, Chem 11–12, 22, 151–52, 153–54, Phys 1, 2.
Required: the general requirements stated under Columbian School of Arts and Sciences, including Bioc 221–22, 223 or 224, 234; BiSc 274 or 275; and the Comprehensive Examination. Students may choose a 30-credit thesis option or a 36-credit nonthesis option.

Doctor of Philosophy in the field of biochemistry—Required: the general requirements stated under Columbian School of Arts and Sciences, including the biomedical sciences core curriculum, Bioc 223, 227, 234, 250, and the General Examination.
Research fields: endocrinology—thymosins, steroid hormones, prostaglandins; viral gene regulation, antiviral chemotherapy; immunology—immunochemistry; viral gene transformation; lipids and membranes—essential fatty acids, membrane biochemistry, lipoproteins, complex lipids, cholesterol, peroxides, atherosclerosis; complement; toxins; HIV-1; bioenergetics—mitochondria, Ca^{2+} transport; tumor cell metabolism; ischemia.

221–22 **General Biochemistry** (4–4)
Gallo and Staff
A comprehensive course in general biochemistry for graduate students in biomedical sciences and undergraduate students in biology and chemistry. Prerequisite: Chem 152, 154. (Academic year)

223 **Biochemical Techniques** (3)
Vanderhoek
Lectures cover basic laboratory techniques used in contemporary biochemical and molecular biological research. (Fall)

224 **Biochemical Techniques Laboratory** (3)
Vanderhoek
Common laboratory techniques used in life science laboratories to separate and characterize macromolecules, including chromatography, gel electrophoresis, immunoassays, spectroscopy, and centrifugation. Prerequisite: Bioc 221. Laboratory fee, $75. (Fall)

225 **Metabolism** (4)
Staff
Metabolic pathways and integration of metabolic processes. Limited to Ph.D. students in the Institute for Biomedical Sciences.

227 **Biochemistry Seminar** (1)
Staff
Current literature in biochemistry. Limited to graduate students in the department. May be repeated for credit. (Fall and spring)

230 **Topics in Protein Chemistry and Enzymology** (2) Hu and Staff
Directed readings in various areas of enzymology. Enrollment limited to graduate students in the department. May be repeated for credit. Prerequisite: Bioc 234.

234 **Structure and Function of Proteins and Enzymes** (3) Hu and Staff
Structure–function relationships of proteins, enzyme kinetics, regulation and reaction mechanisms, and other special topics. Prerequisite: Bioc 221
(Spring)

245 **Current Topics in Bioenergetics** (1 or 2) Staff
Directed readings in various areas of bioenergetics. Enrollment limited to graduate students in the department. May be repeated for credit. Prerequisite: Bioc 222

240 **Nutrition** (2) Walker and Staff
Content includes discussion of RDA, nitrogen balance, vitamins and minerals, diets, and other special topics. Prerequisite: Bioc 201 or 221–22 (Spring)

250 **Molecular Biology** (3) Kumar and Staff
Content includes the organization and replication of genetic material, transcriptional and translational machinery, regulation of eukaryotic gene expression, and other special topics. Prerequisite: Bioc 201 or 221–22 (Fall)

251 **Current Topics in Molecular Biology** (1 or 2) Kumar and Staff
Directed readings in the area of molecular biology. May be repeated for credit. Enrollment limited to graduate students in the department; others may enroll with approval of instructor. Prerequisite: Bioc 250. (Spring)

252 **Biochemical and Molecular Aspects of Selected Diseases** (2) Kumar and Staff
Emphasis on the biochemical and molecular aspects of selected diseases. The format will be of a tutorial type, including presentations of material by students.
(Spring, odd years)

260 **Biochemistry of Lipids and Membranes** (2) Vanderhoek
Biochemistry, structure, and function of various lipid classes, membranes, and receptors. Prerequisite: Bioc 221–22. (Spring, even years)

261 **Current Topics in Lipids** (1 or 2) Gallo, Vanderhoek, and Staff
Directed readings in the area of lipid biochemistry. May be repeated for credit. Enrollment limited to graduate students in the department.

262 **Lipoproteins** (2) Gallo
Composition, synthesis, and metabolism of lipoproteins in normal and dyslipoproteinemic subjects. Prerequisite: Bioc 221–22. (Spring, odd years)

266 **Cellular Biology** (3) Fiskum, Vanderhoek, and Staff
Structure and function of cellular membranes, cytoskeleton, subcellular organelles, cellular bioenergetics, and intercellular interactions. Prerequisite: Bioc 221–22. (Spring)

270 **Biochemistry and Cell Biology of the Immune Response** (2) Goldstein and Staff
Biochemical aspects of the immune response at the molecular and cellular level. Modern experimental approaches to immunology and cell biology. Prerequisite: Bioc 221–22 and Mict 249, or permission of instructor. (Spring)

271 **Current Topics in Immunology** (1 or 2) Goldstein and Staff
Directed readings in the area of biochemical immunology. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bioc 270.

280 **Neurochemistry** (2) Moody and Staff
Content includes molecular structure and function of nerve tissue, intercellular and intercompartmental communication mechanisms, biochemistry of various neurodysfunctions, and other special topics. Prerequisite: Bioc 201 or 221–22.
(Fall)

281 **Current Topics in Neurochemistry** (1 or 2) Moody and Staff
Directed readings in neurochemistry. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bioc 280.

295 **Research** (arr.)
Participation in a project under investigation in the department or in a selected field suggested by the student and approved by the staff. Content varies; each time course is offered, may be repeated for credit. (Fall and Spring)

298 **Advanced Reading** (1 to 6) Staff
Limited to master's degree candidates. May be repeated for credit to a maximum of 6 hours.

299–300 **Thesis Research** (3–3) Staff

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

BIOLOGICAL SCIENCES

Professors D.L. Atkins, R.K. Packer, R. Donaldson (*Chair*), T.L. Hufford, J.R. Burns, D.L. Lapscomb
Adjunct Professors L.R. Parenti, S.H. Weitzman
Professorial Lecturer D. Goldman
Associate Professors R.E. Knowlton, H. Merchant, D.E. Johnson, K.M. Brown
Assistant Professors E.F. Wells, D.W. Morris, J.M. Clark, M.W. Allard, L.C. Smith, G. Hormiga, P.S. Herendeen

Master of Science in the field of biology, botany, or zoology—Prerequisite: a bachelor's degree with a major in one of the following from this University, or an equivalent degree: (1) *Biology field*—an undergraduate major in biology, botany, or zoology; (2) *Botany field*—an undergraduate major in botany or biology; (3) *Zoology field*—an undergraduate major in zoology or biology. The undergraduate program must have included the following courses, or equivalent: Chem 151–52 and 153–54; Math 31; Phys 1, 2, 5, 6; Stat 91 or 227.

Required: the general requirements stated under Columbian School of Arts and Sciences. The minimum requirement consists of 24 credit hours of approved course work plus a thesis (equivalent to 6 credits). With the permission of the department, a student may elect a program of study consisting of 36 credit hours of approved course work without a thesis.

Master of Arts in the field of museum studies, with specialization in the biological sciences, see Museum Studies.

Doctor of Philosophy in the field of biology, botany, or zoology—Required: the general requirements stated under Columbian School of Arts and Sciences, plus satisfactory completion of a Preliminary Examination and the General Examination in at least three areas of biology. The program of study and fields of study are determined in consultation with the advisory committee appointed for each candidate.

Major Research Areas: ecology, evolution and systematics, plant biology, genetics, cell and molecular biology, developmental biology, vertebrate and invertebrate anatomy and physiology, marine and freshwater biology.

Master of Science and *Doctor of Philosophy in the field of geobiology*, see Geobiology.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

204 **Seminar: Invertebrate Zoology** (3) Knowlton
Review of selected topics in physiology, development, and ecology of invertebrate animals, including reports on original publications. May be repeated for credit. Prerequisite: BiSc 140 or equivalent. (Fall)

207 **Seminar: Current Topics in Systematic Biology** (1 or 2) Allard, Clark, Hormiga, Lipscomb
Prerequisite: BiSc 240. (Fall and spring)

208 **Bioenergetics** (3 or 4) Merchant
Study of energy fixation and transfer in ecosystems and of their role in behavior, evolution, population dynamics, and species interactions. Students enrolling for 4 credits will devote one additional class meeting per week to an investigation of the nature and methods of science. Prerequisite: BiSc 154 or permission of the instructor. (Fall, odd years)

209 **Seminar: Principles and Mechanisms of Organic Evolution** (3) Lipscomb
Current problems and issues in evolution; speciation, macroevolution, biogeography, and topics of special interest to participants. Prerequisite: BiSc 150 or equivalent. (Spring)

210 **Phylogenic Systematics** (4) Lipscomb
Lecture (3 hours), laboratory and field (2 hours). Review of selected topics of current interest in the study of evolution, such as principles of phenetic and phylogenetic systematics, study of biogeography, and biochemical methods of examining evolution. Laboratory fee, $40. Prerequisite: BiSc 150 or equivalent (Fall, even years)

211 **Symbiosis and Evolution** (3) Lipscomb
Study of the adaptations and evolution of parasites, including coevolution of parasites and hosts, competition for hosts, evolution of life cycles, and topics of special interest to participants. (Fall, odd years)

214 **The Phylogenetic Basis of Comparative Biology** (3) Hormiga
The use of phylogenetic hypotheses to study questions in evolutionary biology and ecology. Prerequisite: BiSc 210; Stat 127. (Fall)

215 **Vertebrate Paleobiology** (4) Clark
Lecture (3 hours), laboratory and field (2 hours). A survey of fossil vertebrates and theoretical approaches to their interpretation, emphasizing evolutionary studies, such as diversity and extinction analyses, and selected topics of current interest. Prerequisite: BiSc 150 or equivalent. (Spring)

218 **Immune Systems in Plants and Animals** (3) Smith
Defense functions in higher plants and immune mechanisms in sponges through lower vertebrates, with comparisons to immune responses in mammals. Prerequisite: BiSc 102. (Spring)

221 **Variation and Evolution in Plants** (3) Wells
Biosystematics of plants, covering the literature, concepts, and methodology of chemotaxonomy, breeding systems, cytogenetics, and other studies of speciation and classification. Prerequisite: BiSc 107 or 140 or 142 or 150. (Spring, even years)

225 **Molecular Phylogenetics** (4) Voss
Lecture (3 hours), computer laboratory (2 hours). Review of molecular phylogenetic methods including data recovery, alignment, weighting, character optimization, and phylogenetic inference methods. Laboratory fee, $40. Prerequisite: BiSc 107, 150 and 210 or equivalent. (Spring) Lipscomb

227 **Seminar: Genetics** (3)
Review of selected topics in genetics, with emphasis on current literature; topics of special interest to participants encouraged. May be repeated for credit. Prerequisite: BiSc 107 or equivalent. (Fall, odd years) Lipscomb

228 **Population Genetics** (4)
Origin, maintenance, and possible significance of genetic variation in populations. Selection, genetic drift, microevolution of species, and speciation emphasized. Both theoretical and applied aspects of population genetics discussed. Prerequisite: BiSc 107 or equivalent. (Fall, even years) Voss

229 **Cytogenetics** (3)
Behavior of chromosomes in mitosis and meiosis as a basis for the transmission of genes from one generation to the next through reproduction; and the effects of cytogenetic processes on the mechanisms of evolution. Prerequisite: BiSc 102 or 103 and 107 or equivalent. (Fall)

230 **Human Genetics** (4)
Genetic mechanisms of transmission and expression of human traits with emphasis on biochemical and cytogenetic aspects. Prerequisite: BiSc 102 or equivalent; previous course work in cell biology or cell biochemistry strongly recommended. (Spring)

243 **Seminar: Ecology** (3)
In-depth study of selected topics, including reports on original publications. May be repeated for credit. Prerequisite: BiSc 154 or equivalent. (Spring, even years)

249 **Seminar: Developmental Biology** (3)
Discussion and reports on recent research on the endocrinological, genetic, and biochemical aspects of animal development. Prerequisite: one course in developmental biology or cell biology. May be repeated for credit. (Spring, even years)

252 **Seminar: Neurobiology** (3) Atkins
Study of current publications in functional neurobiology. May be repeated for credit with instructor's permission. (Spring, even years)

274 **Gene Regulation and Genetic Engineering** (3) Morris
The control of gene expression as illustrated by several prokaryotic and eukaryotic model systems; discussions of recombinant DNA techniques. Prerequisite: BiSc 107. (Spring, odd years)

275 **Introduction to Recombinant DNA Techniques** (3) Morris
Lecture, 1 hour; laboratory, 4 hours. Basic techniques of genetic manipulation: isolation of phage and plasmid DNA, cloning of genes, transformation of bacteria, mutagenesis of cloned genes, and other techniques. Prerequisite: BiSc 102 or 107 or 137 or equivalent and permission of instructor. Laboratory fee, $40. (Fall, even years)

295 **Research** (arr.) Staff
Investigation of special problems. May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

BIOMEDICAL SCIENCES

Committee on Biomedical Sciences
S. Lalsch (*Interim Director*), V. Chiappinelli, R.P. Donaldson, C. Holland, A. Kumar, F. Noonan, D.K. Strickland

The interdisciplinary doctoral programs in the biomedical sciences are organized within the Institute for Biomedical Sciences. The first full year of study toward the Ph.D. in programs in the fields of biochemistry, genetics, molecular and cellular oncology, neuroscience, and pharmacology is offered through the Institute. Faculty are drawn from GW's Columbian School of Arts and Sciences and School of Medicine and Health Sciences, including scientists from the Children's Research Institute of Children's National Medical Center and the Holland Laboratory of the American Red Cross.

The biomedical sciences core curriculum consists of BmSc 210, 211, 212, and 216–17 (Lecture Loops of BmSc 215, one course chosen from BmSc 213 or 214 or Biol 225, and (if required) BiSc 122 Human Physiology.

Students are admitted directly into the Institute for Biomedical Sciences through the Columbian School of Arts and Sciences. At the end of the first year of study, each student selects one of the five Ph.D. fields and completes remaining degree requirements in the appropriate department or program. See Biochemistry and Molecular Biology, Genetics, Molecular and Cellular Oncology, Neuroscience, and Pharmacology.

210 **Macromolecular Interactions: Proteins** (4) Donaldson
Proteins structure and function; introduction to metabolic processes. Registration with permission of instructor.

211 **Macromolecular Interactions: Nucleic Acids and Information Processing** (4) Kumar, Paterno
Structure and function of nucleic acids, organization of the genome, and regulation of protein synthesis and processing. Registration with permission of instructor.

212 **Cell Biology** (4) Stepp
Structure and functions of cells and tissues; techniques used for the analysis of cell function (image analysis, microscopy). Registration with permission of instructor.

214 **Development and Immunology** (4) Moody
Survey of vertebrate development and immunology with an emphasis on issues of importance to biomedical research. Registration with permission of instructor.

218 **Neurobiology** (4) Perry
An integrated survey of the structure and function of the human nervous system; current issues in neurobiology research. Registration with permission of instructor.

Kennedy

215 Lab Rotations (1)
For Ph.D. students enrolled in the Institute for Biomedical Sciences. Laboratory training in advanced techniques in biomedical sciences research practices. May be repeated for credit.

218–17 Career Skills for the Biomedical Sciences (1–1)
BmSc 216: Planning seminars, research writing techniques, designing grant applications, and ethical issues in the sciences. BmSc 217: Examination of the developing roles of biomedical scientists in varying settings for research and/or policy and program planning, administration of grants, scientific writing and education, and biotechnology and patent law. May be repeated for credit.

BIOSTATISTICS

Columbian School of Arts and Sciences offers the degrees of Master of Science and Doctor of Philosophy in the field of biostatistics. The School of Public Health and Health Services collaborates with the Department of Statistics and the Biostatistics Center in these degree programs. For the Public Health courses listed below, please contact the School of Public Health and Health Services.

Master of Science in the field of biostatistics—Prerequisite: course work in multivariate calculus, matrix theory, and multiple regression (Math 33 and 124 and Stat 118); proficiency in computer applications (Stat 130 or 183 or PubH 251); and at least one course in biology. With approval of the academic director, applicants who lack some of the listed prerequisite course work may be admitted to degree candidacy and fulfill deficiencies during the first year of study; such course work does not count toward degree requirements.

Required: The general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 33 hours of course work, including Stat 201–2, 210, 224, 225, and 227; PubH 201, 240, 280, and 290. Two elective courses are chosen from offerings of the Department of Statistics. A two-part Master's Comprehensive Examination is required.

Doctor of Philosophy in the field of biostatistics—Prerequisite: a master's degree in biostatistics or a closely related field, including the prerequisites listed under the Master of Science in the field of biostatistics. In some cases, an exceptionally well-prepared candidate may enter the program with a bachelor's degree.

Required: The general requirements stated under Columbian School of Arts and Sciences, including the required courses for the Master of Science in the field of biostatistics, plus Stat 213, 226, and 263; PubH 205, 255, and 291; and Stat/PubH 297. Electives are chosen from statistics and public health. At the end of the second year of study, a two-part General Examination is taken on probability and statistical inference and on biostatistics and epidemiology. A minimum of 12 hours of dissertation research is required; the dissertation must demonstrate the candidate's ability to do original research that develops methods or applications in the field of biostatistics.

Staff

295 Reading and Research (arr.) Staff
May be repeated for credit.

299–300 Thesis Research (3–3) Staff

398 Advanced Reading and Research (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. Staff
May be repeated for credit.

399 Dissertation Research (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

CHEMISTRY

Professors T.P. Perros, W.E. Schmidt, N. Filipescu, E.A. Caress, D.A. Rowley, D. Ramaker, M. King (*Chair*), A. Montaser, J.H. Miller
Associate Professor A. Vertes
Assistant Professors D.A. Knight, M.J. Wagner, R.M. Tarkka, S. Barone

Master of Science in the field of chemistry—Prerequisite: a bachelor's degree with a major in chemistry from this University, or an equivalent degree.

Required: the general requirements stated under Columbian School of Arts and Sciences. Course work must include Chem 207, 214, 221, 236, and 251. Proficiency in

puter programming must be demonstrated. Candidates are required to pass a Master's Comprehensive Examination.

Thesis option—30 credit hours of approved courses are required, including Chem 299–300. Thesis Research, which may be in analytical, inorganic, organic, or physical chemistry.

Nonthesis option—36 credit hours of approved courses are required, including Chem 298. Up to 9 credit hours in other departments relevant to the student's area of interest may be included in the program, subject to the approval of the Department of Chemistry. Students who are or will be employed in organizations dealing with science, technology, and public policy programs may wish to select from specified courses offered by the Departments of Management Science, Political Science, and Public Administration and by the Elliott School of International Affairs.

Master of Science in the field of geochemistry—See Geology.

Five-Year Bachelor of Science/Master of Science in the field of chemical toxicology—See the Undergraduate Programs Bulletin.

Doctor of Philosophy in the field of chemistry—Required: the general requirements stated under Columbian School of Arts and Sciences. Chem 207, 213, 221, 235, and 251 are normally required of the doctoral student, in addition to other courses and requirements as determined by consultation with the departmental program committee. Proficiency in computer programming must be demonstrated. The General Examination requirement is replaced by a two-part requirement consisting of a cumulative examination system and a proposal for a research problem.

Research fields: analytical and molecular spectroscopy; catalysis; chemical instrumentation; combustion chemistry; electrochemistry; environmental chemistry; forensic chemistry; inorganic and organometallics synthesis; organic synthesis/natural products; structure and reactivity studies; surface, interface, and materials science; theoretical chemistry; trace and polymer analysis; transition metal complexes.

Ph.D. students in chemistry may substitute up to 12 hours of Dissertation Research (Chem 399) in the form of course work jointly approved by the Chemistry Department and the Science, Technology, and Public Policy program. The purpose of this option is to provide a useful background for chemistry doctoral students who may be employed in government agencies dealing with science, technology, and public policy programs. The 12 hours may be selected from specified courses offered by the Departments of Management Science, Political Science, and Public Administration and by the Elliott School of International Affairs.

Note: All entering students in the master's and doctoral programs in the field of chemistry are required to take the American Chemical Society Graduate Level Placement Examinations, given by the Department of Chemistry prior to registration in Columbian School of Arts and Sciences. The four placement examinations (in the disciplines of analytical, organic, inorganic, and physical chemistry) are designed to cover the subject matter in the disciplines generally taught in modern undergraduate programs preparatory for graduate work in chemistry, and the results are used by the department to advise the individual student in planning a program of courses appropriate to the student's background.

All graduate students are required to participate in the seminar and colloquium programs.

Upon consultation with course instructors, specific prerequisites may be waived for the particular courses.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

207 **Chemical Bonding** (3)
Ramaker
Quantum mechanics, approximate methods, electron spin, Pauli principle, atomic and molecular structure. Prerequisite: Chem 112. (Fall)

211–12 **Physical Chemistry** (2–2)
Ramaker, Wagner, Miller
Same as Chem 111–12. Admission only by departmental permission. Credit assigned upon satisfactory completion of Chem 213. (Academic year)

213 **Chemical Thermodynamics** (3)
Miller
Application of thermodynamics to chemical problems. Emphasis on statistical calculation of thermodynamic properties. Prerequisite: Chem 112 or 212. (Spring)

218 **Molecular Spectroscopy** (3) Wagner
Applications of quantum mechanics and group theory to the interpretation of electronic, vibrational, rotational, and magnetic resonance spectroscopy. Prerequisite: Chem 207. (Spring, odd years)

220 **Selected Topics in Analytical Chemistry** (1 to 3) Staff
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of analytical chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.

221 **Advanced Analytical Chemistry I** (3) Montaser
Theory and application of recent spectrometric methods of analysis, including advances in optimization techniques, optical instrumentation, atomic spectrometry, laser-based analytical techniques, X-ray methods, and surface analysis techniques. Prerequisite: Chem 122. (Fall)

222 **Advanced Analytical Chemistry II** (3) Vertes
Theory and application of electroanalysis and mass spectrometry. Prerequisite Chem 122. (Spring, even years)

230 **Selected Topics in Inorganic Chemistry** (1 to 3) Staff
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of inorganic chemistry. One to three topics may be chosen for a given semester. May be repeated for credit

235–36 **Advanced Inorganic Chemistry** (3–3) Kadish
Application of modern chemical theories to inorganic substances and reactions; detailed study, developed from the periodic table, of the chemistry of the more common elements; introduction to bioinorganic, organometallic, and nuclear chemistry. Prerequisite to Chem 235: Chem 112, 152. Prerequisite to Chem 236: Chem 235. (Chem 235: spring; Chem 236: fall)

240 **Selected Topics in Physical Chemistry** (1 to 3) Staff
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of physical chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.

250 **Selected Topics in Organic Chemistry** (1 to 3) Staff
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field in organic chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.

251–52 **Advanced Organic Chemistry** (3–3) Filippese
Synthesis, reactions, and properties of organic compounds; fundamental theories of organic chemistry, emphasis on reaction mechanisms. Prerequisite to Chem 251: Chem 112, 152. Prerequisite to Chem 252: Chem 251 (Academic year)

257 **Physical–Organic Chemistry** (3) Staff
The transition state theory of chemical kinetics, applications to reaction mechanisms, kinetic isotope effects, linear-free energy relationships, correlation and "super" acids, Woodward–Hoffman rules, free radical reactions. Prerequisite: Chem 252 or permission of instructor. (Fall, odd years)

258 **Synthesis and Structure Determination in Organic Chemistry** (3) Staff
The design of syntheses for complex organic molecules; survey of modern synthetic methods, including asymmetric induction, spectroscopic methods of structure determination. Prerequisite: Chem 251 or permission of instructor. (Fall, even years)

259 **Polymer Chemistry** (3) Staff
A study of the preparation, properties, and structure of macromolecules. Prerequisite: Chem 152 and 110 or 111 or permission of instructor. (Alternate years)

260 **Selected Topics** (1 to 3) Staff
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field in chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.

295 **Research** (arr.) Staff
Research on problems approved by the staff. Open to qualified students who desire advanced training. May be repeated for credit not to exceed a total of 8 credit hours. (Fall and spring)

298 **Independent Study** (3) Staff
Limited to master's degree candidates. A survey of a topic approved by departmental staff and resulting in a written report, and the presentation of a seminar

299–300 **Thesis Research** (3–3) Staff

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

CIVIL, MECHANICAL, AND ENVIRONMENTAL ENGINEERING

Professors H. Liebowitz, T.G. Toridis (*Chair*), K. Mahmood, M.K. Myers, R.E. Kaufman, C.M. Gilmore, J.L. Whitesides, V. Klein (*Research*), D.L. Jones, C.A. Garris, J.D.-Y. Lee, R.H. Tolson, I.H. Shames, S. Sarkani, K.H. Digges (*Research*), L.R. Sandrusky, M.I. Haque
Adjunct Professors B.W. Hannah, B. Whang, D.D. Moran, M.O. Critchfield, M. Yachnis, C.F. Scheffey
Professorial Lecturers J.I. Bregman, W.J. Boettinger, G.C. Everstine, L.A. Sprague, F. Farassat, A. Kohnemuri, C.R. Hauer, J.L. Thomas, J.M. McMichael, P.A. Cooper, S.M. Joshi, E. Safak, J. Hardin, J. Juang, I. Raju
Associate Professors N.E. Bedewi, A. Eskandarian (*Research*), C. Mavriplis, Y.-L. Shen
Adjunct Associate Professor F. Bandak
Associate Professorial Lecturers R.Y.-Y. Ting, K. Khozeimeh, S.L. Zimmerman, T.K. O'Brien, H. Ahmady, A.R. Johnson, J.M. Lucking, A. Tessler, A. Auslander, C. Gerhold
Assistant Professors A.D. Cutler, R. Riffat, M.T. Manzari
Assistant Professorial Lecturers R. Lee, T.L. Walton, Jr., G.E. Hicho, S. Feng, E.A. Morelli

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

CIVIL ENGINEERING

201 **Design of Metal Structures** (3) Toridis and Staff
Structural behavior of metal structures, conception and design of advanced structural components and systems, hysteretic behavior, plastic design principles, box-type girders, cable systems, composite girders, and special topics. Prerequisite: CE 191 or equivalent. (Spring)

202 **Design of Reinforced Concrete Structures** (3) Toridis and Staff
Structural behavior of reinforced concrete structures, ultimate strength and deformation characteristics; design of structural components including beams, columns, floor slabs, box-type girders, Introduction to prestressed concrete, special topics. Prerequisite: CE 192 or equivalent. (Fall)

203 **Prestressed Concrete Structures** (3) Toridis and Staff
Structural behavior and failure modes of prestressed concrete structures; design of prestressed concrete, including long span structures, bridges, and precast systems. Prerequisite: CE 192 or equivalent. (Spring, even years)

204 **Fundamentals of Soil Behavior** (3) Manzari and Staff
Soil mineralogy, clay–water–electrolyte systems, soil composition, fabric, structure, volume change behavior, permeability, coupled phenomena, in-situ evaluation of soil behavior. Prerequisite: CE 168 or equivalent. (Fall, even years)

205 **Theoretical Soil Mechanics** (3) Manzari and Staff
Porous media, stress–strain behavior of soil skeleton, elastic and elastoplastic models for soil behavior, critical state concept, cam clay, strength of soils, stress–dilatancy, stress paths. (Fall, odd years)

206 **Geotechnical Engineering** (3) Manzari and Staff
Principles of soil mechanics applied to the analysis and design of: mat foundations, pile foundations, retaining structures including sheeting and bracing systems, and waterfront structures. Foundations on difficult soils and reinforced earth structures. Prerequisite: CE 168 or equivalent. (Spring)

207 **Geotechnical Earthquake Engineering** (3) Manzari and Staff
Ground motion, wave propagation, foundation isolation, site response analysis, seismic stability of retaining structures, soil structure interaction. Prerequisite: graduate standing. (As arranged)

208 **Rock Engineering** (3) Staff
Classification and properties of rock, nature of rock masses and rock discontinuities, field exploration, methods of excavation, design and applications

to foundation slopes, tunnels, and chambers in rock. Prerequisite: approval of department. (As arranged)

210 **Methods of Structural Analysis** (3) Toridis and Staff
Modern methods of analysis of statically indeterminate structures, matrix analysis based on flexibility, stiffness, energy and variational methods; substructuring techniques; consideration of plastic collapse of structures; introduction to the finite element method. Prerequisite: graduate status (Fall)

211 **Environmental Chemistry** (3) Riffat and Staff
Principles of chemistry of natural waters, water supplies, wastewaters, hazardous wastes. Stoichiometry, equilibrium, solubility, kinetics, organic chemistry, biochemistry, analytical techniques. Examples from water wastewater practice to illustrate applications. (Fall, odd years)

212 **Open Channel Flow** (3) Mahmood and Staff
Types and regimes of flow; energy and momentum principles, uniform flow, gradually varied flow, spatially and rapidly varied flow. Flow in nonprismatic channels. Unsteady flow; dam break problem, flood routing. Prerequisite: CE 193 or equivalent. (Fall)

213 **Hydraulic Engineering** (3) Haque and Staff
Hydraulic design of conveyance, regulating, and measurement structures. Design for spillways, energy dissipators, inlet and outlet works related to dams. Forces on hydraulic structure and stability analysis. Hydraulic turbines and pumps. Design considerations for flow through pipes. Transients and cavitation. Prerequisite: CE 193 or approval of department. (As arranged)

214 **Design of Dams** (3) Mahmood and Staff
Project planning and investigations. Types of dams, design of earth and rock dams; stability analysis, foundation treatment, wind wave protection, construction methods for dams. Reservoir sedimentation. Safety inspection of dams. Prerequisite: CE 193 or graduate status (Spring, even years)

216 **Advanced Hydrology** (3) Mahmood
Precipitation, evaporation and transpiration. Soil physics, stream flow, drainage basins, hydrograph analysis, and stream-flow routing. Design storms, flood frequency statistics and analysis, flood forecasting and control, water supply forecasting. Prerequisite: CE 195 or equivalent. (Spring, even years)

219 **Groundwater and Seepage** (3) Haque and Staff
Permeability theory of groundwater flow, flow nets, analogs, computer solutions, applications to engineering problems such as excavation dewatering, flow through dams, stabilization of earth slopes. Prerequisite: approval of department (Spring)

220 **Urban Transportation Engineering** (3) Staff
Introduction to urban transportation planning. Analysis of urban transportation requirements. Evaluation procedure for selecting among alternative systems. Prerequisite: approval of department (Fall, odd years)

221 **Pavement and Runway Design** (3) Staff
Pavement types, wheel-load characteristics, stresses in pavements and subgrades, empirical methods of design of flexible and rigid highway and airport pavements, general principles of runway design. Prerequisite: CE 202, 204, 205 (Spring, odd years)

223 **Traffic Engineering** (3) Staff
Roadway traffic capacity and other road network performance measures, methods of characterizing steady and unsteady traffic flow phenomena, driver behavior monitoring techniques, instruments and data processing, traffic control signalization theory and practical implementation. Prerequisite: approval of department. (Fall, even years)

237 **Advanced Sanitary Engineering Design** (3) Riffat and Staff
Elements of design including basic parameters and hydraulic requirements. Layout and design of water supply and wastewater systems, pumping stations and treatment plants. Plant expansions and modifications. Prerequisite: CE 207 or equivalent (Spring)

240 **Principles of Environmental Engineering** (3) Riffat and Staff
Basic concepts of water, air, and terrestrial environments and interrelationships among them. Principles of environmental chemistry and microbiology. Assessment of environmental quality and impacts. Environment and health. Water and wastewater systems. Legal and regulatory controls (Fall)

241 **Water and Wastewater Treatment Processes** (3) Riffat and Staff
Theory and application of commonly used processes. Sedimentation, coagulation, filtration, disinfection, gas transfer, activated sludge, trickling filters, oxidation ponds, sorption, and sludge stabilization and disposal. Process combinations to produce treatment systems. Prerequisite: CE 240. (Spring, even years)

243 **Environmental Impact Assessment** (3) Riffat and Staff
Public policy and legislation on environmental quality. Methods for assessing impacts of engineering projects. Technology for assessing impacts on air, water, and land environments, applied to transportation facilities, water and wastewater facilities, industrial and community development. (Fall)

250 **Advanced Metal Structures** (3) Toridis and Staff
Conception, analysis, and design of low-rise and high-rise buildings by elastic and inelastic methods, suspended roofs, earthquake considerations, and unique structural systems. Prerequisite: CE 201 or equivalent. (As arranged)

251 **Advanced Reinforced Concrete Structures** (3) Toridis and Staff
Conception, analysis, and design of low-rise and high-rise buildings by ultimate-strength methods, precast systems, progressive collapse, earthquake considerations, domes, folded plates, shell-type structures, and special topics. Prerequisite: CE 202 or equivalent. (As arranged)

254 **Reliability Analysis of Engineering Structures** (3) Sarkani and Staff
Probability theory, theory of structural reliability, probabilistic analysis of strength and loads, risk and reliability function, empirical distribution, probability plot. The design service life, method of perturbation, Monte Carlo simulation, fatigue and fracture, proof testing, inspection and repair–replacement maintenance. Prerequisite: approval of department. (Fall, odd years)

254 **Special Topics in Structural Engineering** (3) Toridis and Staff
Selected problems, such as thermal stresses in structural systems, variational methods in structural engineering, structural design for dynamic loads and repeated loads, or advanced structural applications. Topic announced in the *Schedule of Classes*. May be repeated for credit. Prerequisite: CE 210 and approval of department. (As arranged)

255 **Introduction to Ocean and Coastal Engineering** (3) Staff
Incompressible fluid mechanics and applications to analysis of wave motions, circulations, and other free surface flows in coastal and offshore regions: wave spectra, water-level fluctuations, tides, tsunamis, oscillations, and storm surges, wind-generated waves, beaches, sediment transport, wave forces on coastal and offshore structures. Prerequisite: approval of department. (Fall)

256 **Coastal Processes** (3) Staff
Coastal sediment properties and analysis, longshore transport processes and rates, sediment budget, response of beaches to wave action and structures, tidal inlets, mechanical bypassing, beach nourishment, wind transport in sand dune stabilization, sediment tracing. Prerequisite: CE 255. (Spring, even years)

257 **Harbor and Coastal Engineering** (3) Staff
Applications of principles of ocean and coastal engineering to coastal protection structures, harbor design and navigation, breakwaters, seawalls, quays, docks, sediment transport in the coastal regime, estuaries and deltas, dredging for maintenance of channels and harbors. Prerequisite: CE 255. (Spring, odd years)

258 **Application of Probability Methods in Civil Engineering** (3) Sarkani and Staff
Uncertainty in real-world information; basic probability concepts and models, random variables, useful probability distributions, statistical estimation of distribution parameters from observed data, empirical determination of distribution models, testing hypothesis, regression and correlation analysis, decision theory. Prerequisite: ApSc 113 or equivalent. (Fall, even years)

261 **Analysis of Plates and Shells** (3) Staff
Bending and stretching of thin elastic plates under loading with various boundary conditions, continuous plates and plates on elastic foundations, theory of folded plate structures. Theory of curved surfaces; general linear bending theory and its simplification to membrane theory; bending stresses in shells of revolution; shallow shell theory. Prerequisite: graduate status. (Spring, odd years)

263 **Theory of Structural Stability** (3) Toridis and Staff
General criteria for stability, buckling of elastic and inelastic columns and frames, torsional and lateral buckling, variational methods. Buckling of plates and shells under static loads, stability of stiffened structures, effect of imperfections and boundary conditions. Prerequisite, graduate status (Fall)

264 **Structural Design to Resist Natural Hazards** (3) Sarkani and Staff
Prediction of forces due to earthquakes and strong winds, generalized codes, pseudostatic methods for preliminary design, codes based on spectra, energy absorption and ductility; influence of foundations, ground failures, static and aeroelastic effects of strong winds. Design project. Prerequisite: approval of department. (Fall, even years)

265 **Special Topics in Geotechnical Engineering** (3) Staff
Selected topics, such as rheology of soils, computer applications, excavation and tunneling, or ocean engineering problems. May be repeated for credit. Prerequisite: approval of department. (As arranged)

271 **Theoretical Marine Hydromechanics** (3) Staff
Derivation of the fundamental equations and boundary conditions of fluid media, application of potential-flow theory to fluid motion around two- and three-dimensional bodies, perturbation concepts. Derivation of force and movement of bodies in calm and disturbed water. Prerequisite: approval of department. Offered off campus only. (As arranged)

272 **Microbiology for Environmental Engineers** (3) Riffat and Staff
Principles of microbiology and applications to lakes, streams, hazardous wastes, and biological treatment systems. Methods for evaluating impacts of wastewaters and hazardous wastes on ecological systems. Concepts of limnology, including limiting of nutrients and control of nuisance growths. (Spring, even years)

273 **Advanced Treatment Processes** (3) Riffat and Staff
Principles and applications of advanced treatment systems for water, wastewater, and hazardous wastes, including: biological nutrient removal, oxidation-reduction processes, stripping, sorption, membrane processes, chemical precipitation, others. Prerequisite: CE 241. (Spring, odd years)

274 **Mechanics of Water Waves** (3) Staff
Irrotational theory for deep- and shallow-water waves, reflexion, refraction, diffraction, attenuation. Water waves of finite amplitude, shallow-water waves, tides, bores, long-waves theory, cnoidal and solitary waves. Wave generation by wind. Wave breaking and reflexion. Prerequisite: ApSc 213 and permission of instructor. (As arranged)

275 **Special Topics in Ocean Engineering** (3) Staff
Selected topics, such as marine aspects of viscous-flow theory, internal (internal) waves, or applied random processes in ocean and coastal engineering. May be repeated for credit. Prerequisite: approval of department. (As arranged)

276 **Water Resources Planning and Control** (3) Mahmood and Staff
The parameters of water resources planning and control, economics of water resources and related natural resources, economics of water-quality control, physical parameters of water resource development, water resources law. Prerequisite: approval of department. (Fall, even years)

277 **Industrial Waste Treatment** (3) Staff
Types of industries, waste sources, characteristics, measurements and evaluation. Minimization and reuse. Treatment process selection, development, and design. Regulations, permits, standards, monitoring, and pretreatment. Prerequisite: CE 240 or approval of department (Fall, odd years)

278 **Pollution Transport System** (3) Staff
Distribution of pollutants in natural waters and atmosphere, diffusion and advective transport, mathematics for stream pollutant deoxygenation and groundwater pollution transport, sediment transport, thermal transport, numerical simulation of pollutant transports in streams and estuaries. Prerequisite: CE 193, ME 131. (Fall, even years)

279 **Introduction to Hazardous Wastes** (3) Staff
Regulations, including RCRA and Superfund. Transport and fate of hazardous substances. Elements of environmental toxicology, risk assessment and ranking. Monitoring, data collection, and evaluation. Waste management case histories. Prerequisite: approval of department (Spring, odd years)

281 **Special Topics in Water Resources** (3) Mahmood and Staff
Morphometric properties of drainage basins, drainage network analysis, hydraulic geometry of streams, advanced hydraulics of alluvial channels, modeling of drainage basins, computer applications, stochastic hydrology. Prerequisite: approval of department. (As arranged)

282 **Hydraulic Modeling** (3) Mahmood and Staff
Dimensional analysis and similitude. Types of models—physical, mathematical. Distortions in physical models. Erodible bed models. Prerequisite: CE 193. (Spring, odd years)

283 **Special Topics in Environmental Engineering** (3) Staff
Selected topics, such as in-depth evaluation of current issues in the field, new technological approaches for resolving environmental quality problems, environmental health matters, handling of residuals, and engineering methodologies. (As arranged)

284 **Numerical Methods in Environmental and Water Resources** (3) Mahmood and Staff
Use of microcomputers in water resources. Elements of finite difference schemes, basic operations, convergence, stability, and consistency. Nonuniform flow and error analysis, unsteady laminar flow: diffusion problems, unsteady flow in open channels; water hammer, seepage flow, and diffusion–dispersion problems. Prerequisite: approval of department. (Spring)

298 **Research** (arr.) Staff
Basic research projects, as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

310 **Sedimentation Engineering** (3) Mahmood and Staff
Problems of erosion and sedimentation. Properties of sediment. Initiation of motion. Suspension of sediment and sediment discharge theories. Sedimentation measurements. Economic and legal aspects. Prerequisite: CE 212 or approval of department. (Fall, odd years)

311 **Mechanics of Alluvial Channels** (3) Mahmood and Staff
Physical processes in drainage basins and channels. Channel forms and bed forms. Hydraulics and sediment transport in alluvial channels. Design of stable channels. Qualitative and quantitative response of rivers. Channel stabilization, navigation channels. Case studies including environmental impacts. Prerequisite: CE 212 or approval of department. (Fall, even years)

312 **Advanced Hydraulics** (3) Mahmood
Theory of unsteady flow. Diffusion and dispersion through pipes and open channels. Numerical solutions using finite element and finite-difference methods. Prerequisite: CE 212 or approval of department. (Spring, even years)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Science candidates. May be repeated for credit.

MECHANICAL ENGINEERING

Note: The following mechanical engineering courses are offered at NASA–Langley Research Center and may be offered on campus when arranged: ME 201, 202, 203, 208, 233, 234, 247, 248, 269, 271.

401 **Computational Fluid Dynamics Laboratory** (1) Staff
Development of computer programs for solving fluid dynamics problems for incompressible and compressible inviscid and viscous flows. Prerequisite or concurrent registration: ME 228. (As arranged)

202 **Computational Aerodynamics Laboratory** (1) Staff
Use of computational aerodynamics methods for conducting engineering studies of practical low-speed, transonic, and high-speed flows. Prerequisite or concurrent registration: ME 222. (As arranged)

203 **Experimental Techniques in Aerodynamics** (3) Staff
The wind tunnel, instrumentation devices, boundary corrections, testing procedures, data reduction, laboratory experiments including calibration of instruments, lectures on calibrations and two-dimensional and three-dimensional model tests. Prerequisite: approval of department. (As arranged)

204 **Advanced Instrumentation Techniques** (3) Jones and Staff
Pressure and temperature sensors; shadowgraph, schlieren and interferometer systems, laser holography, laser Doppler velocimetry; signal conditioning, use of amplifiers, digital techniques, signal multiplexing; use of computers; error analysis and data handling. Prerequisite: approval of department. (Fall, odd years)

208 **Research in Computational Fluid Dynamics** (1 to 3) Staff
Specific research projects in conjunction with experimental laboratory course or computational labs. Prerequisite: approval of department. (As arranged)

218 **Design of Floating and Submerged Marine Vehicles** (3) Staff
Consideration of interaction between hydrodynamics, propulsion, and configuration aspects of design of floating structures and vehicles; effects of submergence and deep submergence, hydrofoil and vertical jet action; structural considerations. Prerequisite: EngS 228. (As arranged)

221 **Fluid Mechanics** (3) Garris, Mavriplis, Myers, and Staff
Continuum, kinematics of fluids, stress and strain rate tensors, fundamental equations of viscous compressible flows. Irrotational flows; sources, sinks, doublets, and vortices. Laminar flow of viscous incompressible fluids; boundary-layer concept. Prerequisite: approval of department. (Fall)

222 **Applied Aerodynamics** (3) Mavriplis and Staff
Introduction to practical and computational methods for solving two-dimensional and three-dimensional aerodynamics problems. Linear methods, nonlinear potential methods, coordinate transforms, and boundary-layer methods. Prerequisite: EngS 284, ME 221. (Spring, odd years)

225 **Turbomachinery** (3) Garris and Staff
Turbine, compressor, and pump types and uses; dimensional analysis of turbomachines; cycle analysis of gas and steam turbines, energy interchange in flow machinery, design, characteristics, and performance of turbines, compressors, and pumps; comparison of types of turbines, compressors, and pumps. Prerequisite: ME 221. (Fall, odd years)

227 **Viscous Flow** (3) Mavriplis, Cutler, and Staff
Exact solutions of Navier–Stokes equations; the laminar boundary-layer theory. Reynolds stresses and turbulence, internal, boundary-layer, and mixing flows. Applications to heat and mass transfer and to reacting flows. Prerequisite: ApSc 213, ME 221, or equivalent. (Fall, even years)

228 **Computational Fluid Dynamics** (3) Mavriplis, Whitesides, and Staff
Theory of discrete methods for solving the governing equations of fluid dynamics. Potential flow, Euler equations, Navier–Stokes equations. Emphasis on algorithm development appropriate to modern supercomputers. Prerequisite: EngS 284, ME 221. (Fall, even years)

231 **Hydrodynamics** (3) Garris and Staff
Inviscid flows in two and three dimensions and irrotational flow theory, conformal mapping and applications. Helmoltz theorems and vorticity dynamics. Applications, such as finite wing theory, instabilities. Free surface flow, Froude numbers, sheet vortex. Prerequisite: ME 221 or equivalent (Spring, odd years)

233 **Aeroelasticity I** (3) Whitesides and Staff
Static and dynamic structural deformations; static aeroelasticity (structural deformation, divergence, control effectiveness, and reversal); dynamic aeroelasticity (flutter, response to gusts and turbulence); unsteady aerodynamics for 2-D wings; strip theory for 3-D lifting surfaces; piston and Newtonian flow theories. Prerequisite: EngS 257, ME 221. (As arranged)

234 **Aeroelasticity II** (3) Whitesides and Staff
Steady and oscillating 3-D planar and nonplanar lifting surfaces in subsonic and supersonic flow. Continuous-load and discrete-load methods. Time-dependent motion of arbitrary configurations in subsonic, transonic, and supersonic flow. Inviscid and viscous flows. Aeroelasticity in structural design. Prerequisite: ME 233. (As arranged)

245 **Compressible Flow** (3) Myers, Mavriplis, and Staff
Thermodynamics and physical properties of gases, fundamental equations of compressible inviscid fluid, choking, small perturbation theory, role of vorticity in supersonic flow, shock-wave interactions, hodograph transformation, transonic flow theory, method of characteristics. Prerequisite: ApSc 213, ME 221, or equivalent (Spring, even years)

237 **Propulsion** (3) Cutler and Staff
Basic concepts of propulsion: energy transformations in propulsive flows, gas dynamics of combustion. Thermal and propulsive efficiencies. Cycle and engine component analysis. Intake, nozzle performance. Drag and thrust generation. Augmentation. Propellers, turbojets, turbofans, ramjets, and rockets. Prerequisite: approval of department. (Spring)

239 **Space Propulsion** (3) Staff
Advanced chemical propulsion: dynamic combustion and instabilities in solid propellants. Injection, atomization, mixing in liquid propellant engine performance. Plasma propulsion: electrostatic, electromagnetic, and electrothermal instabilities (laser and microwave). Nuclear propulsion. Prerequisite: ME 237. (Fall, odd years)

240 **Kinematic Synthesis** (3) Kaufman and Staff
Techniques for the analysis and synthesis of function, path, and motion generating mechanisms. Methods for the dimensional design of mechanisms. Computer-aided techniques for the optimal design of planar linkages. Review of recent developments and current research. Term project. Prerequisite: ME 190 or equivalent. (Spring, even years)

241 **Computer Models of Physical and Engineering Systems** (3) Kaufman and Staff
Reduction of physical and engineering systems to simplified physical and mathematical models. Manipulation of models using PASCAL programming. Numerical algorithms for optimization, graph identification, min-sum arithmetic, and searching. Styles of problem solving. Prerequisite: ME 117. (Spring)

242 **Advanced Mechanisms** (3) Kaufman and Staff
Emphasis on spatial kinematics. Analysis and synthesis of mechanisms. Analytical techniques using matrices, dual numbers, quaternion algebra, finite and instantaneous screws, theory of envelopes. Applications to design of linkages, cams, gears. Use of digital computers in mechanism analysis and design. (Spring, odd years)

243 **Advanced Mechanical Engineering Design** (3) Jones and Staff
Design of mechanical engineering components and systems emphasizing computer-aided engineering (CAE), including interactive computer graphics, finite element analysis, and design optimization. Creation of a complete design on an engineering workstation using I-DEAS. Prerequisite: approval of department. (Fall)

245 **Robotic Systems** (3) Bedewi, Lee, and Staff
Classification, features, and applications of industrial robots. Spacial descriptions and transformations, forward and inverse kinematics, Jacobian matrix, velocities and static forces, manipulator dynamics and controls. Robot actuators, transmissions, sensors, end effectors, and programming. Prerequisite: ME 182 or equivalent. (Spring)

246 **Electromechanical Control Systems** (3) Bedewi, Lee, and Staff
Advanced techniques for system synthesis, compensation, and stabilization. Linear and nonlinear characterization of control components. Time domain analysis and synthesis. Introduction to digital control theory and its applications. Prerequisite: ME 182 or equivalent. (Fall)

247 **Seminar: Aircraft Design I** (3) Sandusky
Conceptual design methods used in response to prescribed mission and performance requirements, alternate configuration concepts. Configuration general arrangement and empennage sizing. Estimation of aircraft size, weight, and balance, lift, thrust and drag, system level tradeoff and sensitivity studies. (Fall)

248 **Seminar: Aircraft Design II** (3) Sandusky
Preliminary design methods used to refine a conceptual aircraft configuration. Area ruling, computer-aided design methods and structural arrangement; estimation of aircraft static and dynamic stability and control sizing, inlet design, detailed tradeoff and sensitivity studies, economic and reliability considerations. (Spring)

249 **Spacecraft Design** (3) Staff
Computer-aided design of spacecraft and satellites to meet specific mission requirements. Environment, propulsion, structure, heat transfer, orbital mechanics, control considerations. Use of modern computer codes for design studies. Prerequisite: approval of department. (Spring, odd years)

250 **Launch Vehicle Design** (3) Staff
Computer-aided design of hypersonic launch vehicles to meet specific mission requirements. Propulsion, structures, flight path, aerothermochemistry, control considerations. Use of modern computer codes for design studies. Prerequisite: approval of department. (As arranged)

251 **Computer-Integrated Manufacturing** (3) Shen and Staff
Automation techniques for processing metals, polymers, and composites. Use of sensing and process modeling in process control. Numerical control and robot applications and limitations. Integration, scheduling, and tool management in the computer-integrated factory. Quality control. Social and economic considerations in CIM. Prerequisite: ME 192 or equivalent. (Spring)

252 **Projects in Computer-Integrated Design and Manufacturing** (3) Shen and Staff
Applications of the concepts of computer-integrated manufacturing to group projects, culminating in written and oral presentations. Robot programming, vision-guided assembly, force sensing, fixturing, and end-effector design for practical applications. Factory simulation, part scheduling, and NC program verification algorithms. Prerequisite: ME 251. (Fall, odd years)

253 **Tribology** (3) Staff
Fundamentals of the friction, wear, and lubrication of metals, polymers, and ceramic and composite materials. Theories of friction and wear, techniques for surface characterization, wear coatings, solid and boundary lubrication. Tribological problems in the application of ceramic components. Prerequisite: CE 166 or equivalent. (As arranged)

257 **Energy Systems Analysis I** (3) Staff
Analysis of energy resources and conversion devices. Statistical data analysis, forecasting, I-O, and net energy analyses, mathematical modeling. Prerequisite: approval of department. (Fall)

258 **Energy Systems Analysis II** (3) Staff
Life-cycle costing, Second Law (energy) analysis, technological assessment, computer-assisted synthesis (CAS), society–technology interfaces. It is recommended that ME 257 and 258 be taken in sequence. Prerequisite: approval of department. (As arranged)

259 **Solar Heating Systems** (3) Staff
Methods of solar energy collection and storage. Theory of flat-plate collectors, solar energy system analysis, design of solar water-heating and space-heating systems, economics of solar heating systems. Passive solar heating systems. Solar industrial process heat. Prerequisite: ME 187 or equivalent. (Fall, odd years)

260 **Heating and Air-Conditioning of Buildings** (3) Staff
Heating and cooling load calculations, system design and energy consumption analysis. Codes and standards for building energy management, energy conservation. Heating and air-conditioning systems, central-control systems, cost estimates. Prerequisite: ME 187 or equivalent. (Spring, odd years)

261 **Air Pollution** (3) Staff
Introductory course on the generation, monitoring, and control of air pollution. Atmospheric pollutants; current levels and health problems. Combustion chemistry and mixing. Photochemical processes, smog and measurements. Atmospheric dispersion; inversion and acid rain. Prerequisite: approval of department. (Fall, odd years)

269 **Wind Tunnel Research Techniques** (3) Cutler and Staff
A comprehensive survey of wind tunnel research facilities and techniques. Subsonic, transonic, supersonic, and hypersonic facilities. Basic principles of wind tunnel design and associated research equipment. Data acquisition and reduction, research methods, static and dynamic testing techniques. Prerequisite: approval of department. (Spring)

270 **Aerodynamics of Flight Vehicles** (3) Whitesides and Staff
Aerodynamic loads on flight vehicles, interference effects, application of aerodynamic theory to aircraft design, studies of aircraft dynamics and performance. Prerequisite: approval of department. (Spring)

271 **VTOL Aircraft Technology** (3) Whitesides and Staff
Fundamental principles of VTOL aircraft. Hovering performance based on momentum theory, analysis of jet-induced interference effects, transition dynamics, theoretical stability and control and correlation with flight data.

ground-effect theory and experiment, handling-qualities criteria. Prerequisite: approval of department. (Spring)

273 **Principles of Automatic Flight Control** (3) Klein and Staff
Design of aeronautical instrumentation and feedback controls; mathematical models of sensors, controllers, and actuators; theory of feedback control; stability, accuracy, and speed of response; equalization; effects of nonlinearities and noise. Prerequisite: approval of department. (Spring)

274 **Dynamics and Control of Spacecraft** (3) Tolson and Staff
Fundamentals of satellite attitude dynamics, stabilization, and control. Spacecraft attitude determination and control of spinning and three-axis stabilized spacecraft. Elements of linear control theory for single-input, single-output systems, and basic feedback control laws for attitude stabilization. Prerequisite: Approval of department. (Spring, even years)

275 **Stability and Control of Aircraft** (3) Klein and Staff
Derivation of equations of motion, Euler transformations and direction cosines, stability derivatives and linearization of equations of motion, stability of linear systems with application to longitudinal and lateral dynamics, Laplace transform techniques, and frequency-response analysis. Prerequisite: approval of department. (Fall, even years)

276 **Mechanics of Space Flight** (3) Tolson and Staff
Two-body problems, including orbital elements, universal variables, orbit determination, Kepler's equations, orbit transfers, and Lambert's theorem. Orbital perturbation, variation of parameters, drag and oblateness effects. Prerequisite: EngS 217 or approval of the department. (Fall, even years)

278 **Guidance and Navigation of Spacecraft** (3) Tolson and Staff
Fundamentals of spacecraft guidance, navigation, and control. Review of the mathematical fundamentals, explicit and implicit guidance schemes. Application of estimation theory to guidance and navigation. Lambert's problem and ascent guidance for launch vehicle flight control. Hardware implementation requirements. (Fall, even years)

279 **Special Topics in Flight Sciences** (3) Staff
Prerequisite: approval of department. (As arranged)

280 **Intermediate Thermodynamics** (3) Staff
Macroscopic and microscopic descriptions of thermodynamic systems. Conditions of equilibrium and stability of thermodynamic systems. Review of methods of statistical thermodynamics. Properties of perfect gases and crystals. Review of elements of kinetic theory and transport phenomena. Selected applications. Prerequisite: approval of department. (Fall)

281 **Advanced Thermodynamics** (3) Staff
The concept of ensembles; Boltzmann, Fermi–Dirac, and Bose–Einstein statistics; balance and entropy-production equations. Linear and nonlinear nonequilibrium thermodynamics; Benard instability and fluctuation theory. Integration of subjects using information theory, computational techniques. Prerequisite: ME 280 or equivalent. (As arranged)

286 **Special Topics in Mechanical Engineering** (3) Staff
Prerequisite: approval of department. (As arranged)

287 **Heat Conduction** (3) Staff
Conduction of heat through solid, liquid, and gaseous media. Formulation and methods of analytical, numerical, and analog solutions. Steady two- and three-dimensional problems; problems in unsteady heat conduction; conduction in composite regions. Prerequisite: ApSc 213 or equivalent. (Fall, even years)

288 **Convective Heat and Mass Transfer** (3) Cutler and Staff
Heat and momentum transfer in laminar and turbulent flow. The laminar boundary-layer solution. Similarity and nondimensional parameters. Mass-momentum heat transfer analogy. Convective heat transfer at high velocity. Stability, transition, and turbulence. Free convection. Prerequisite: ME 224 or equivalent. (Spring, odd years)

289 **Radiative Heat Transfer** (3) Cutler and Staff
Thermal radiation; laws of intensity attenuation and generation. Solid angles and frequency spectrum. Surface properties and view factors; design of furnaces and radiant boilers. Optical temperature diagnostics; remote sensing. Prerequisite: approval of department. (Fall, odd years)

291 **Power Systems** (3) Staff
Design of thermal power system components and system optimization. Heat balance studies, options for improved cycle efficiencies, component selection and design, safety and pollution regulations. Survey of electric power system technology. Prerequisite: ME 187 or equivalent (Fall, even years)

293 **Combustion** (3) Garris and Staff
Basic combustion phenomena. Rate processes and chemical kinetics. Chain reaction theory. Detonation, deflagration, diffusion flames, heterogeneous combustion. Experimental measurements. Impact of pollution regulations and alternate fuels. Prerequisite: approval of department. (Spring, even years)

295 **Statistical Thermodynamics** (3) Staff
Boltzmann, Bose–Einstein, and Fermi–Dirac statistics; partition functions, correspondence between classical and statistical thermodynamics. Systems with negligible effects of interparticle forces, perfect gases. The Debye solid, the Einstein solid. Prerequisite: ME 280. (As arranged)

296 **Special Topics in Heat and Mass Transfer** (3) Staff
Prerequisite: approval of department. (As arranged)

297 **Special Topics in Fluid Mechanics** (3) Staff
Prerequisite: approval of department. (As arranged)

298 **Research** (arr.) Staff
Research as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

311 **Nonsteady Flow** (3) Garris, Myers, and Staff
Fundamental equations of nonsteady viscous flow. Characteristics and waves. Initial and boundary conditions. Piston theory and the oscillating airfoil. Nonsteady flows with entropy production. Gas dynamics of nonsteady combustion. Prerequisite: ME 235 or 237, or equivalent. (As arranged)

312 **Theory of Turbulence** (3) Mavriplis and Staff
Concept of turbulence, transition and linear theory of flow stability, experimental observations on turbulence generation, turbulent kinetic energy dissipation, statistical description of turbulence, mean turbulent energy and Reynolds stress closure models, turbulent shear flows in free turbulence and wall turbulence. Prerequisite: ME 227. (As arranged)

315 **Hypersonic Flow** (3) Staff
Shock waves in hypersonic limits, one-dimensional piston problem, and method of characteristics. Hypersonic small-disturbance theory. Unsteady and similarity parameters. Newtonian flow theory for slender and blunt bodies. Hypersonic viscous interaction phenomena. Prerequisite: ME 235. (As arranged)

317 **Physical Gas Dynamics** (3) Staff
Molecular and atomic phenomena in gases, intermolecular forces, specific heats, equation of state for a real gas, dynamics of dissociating gas, radiation. Prerequisite: ME 235, 295, or equivalent. (As arranged)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Science candidates. May be repeated for credit.

ENGINEERING SCIENCE

Note: The following engineering science courses are offered at NASA-Lewis Research Center and may be offered on campus when arranged: EngS 270, 271, 285, 286, 310, 311.

201 **Introduction to Manufacturing** (3) Shen and Staff
Fundamentals of modern manufacturing. Processes for manufacturing mechanical and electronic components from metals, polymers, ceramics, and silicon. Manufacturing systems, CAD, robotics, and design for assembly. Current capabilities, technological needs, and competitiveness. Examples from the aerospace industries. Prerequisite: approval of department (Fall)

204 **Introduction to Biomechanics** (3) Tordis, Bandak, and Staff
Fundamentals of continuum mechanics as they apply to biological systems; statics and dynamics; concepts of stress, strain, and equilibrium; elastic and viscoelastic properties of solids; and strength of materials. Fundamentals

fluid mechanics; physiological fluid mechanics and bioheat and mass transfer. Fundamentals of solid mechanics of soft tissues and bone structures. Development of computer models and applications. Prerequisite: CE 120. (Spring) Staff

208 **Energy Conservation** (3)
Conservation methods in the home, in transportation, and in industrial manufacturing and commercial sectors. Second law of thermodynamics from a conservation viewpoint. Construction methods for low energy consumption in large and small edifices. Environmental effects. Prerequisite: approval of department. (As arranged)

215 **Advanced Strength of Materials** (3) Staff
Deflection of beams using singular functions, unsymmetrical bending of beams, beams on elastic foundation. Beam-column problems, shear center for thin-walled beam cross sections, curved beams. Applications of energy methods, torsion, basic equations for theory of elasticity, thin- and thick-walled cylinders, stress concentration, and failure criteria. Prerequisite: CE 120. (Spring)

217 **Analytical Mechanics** (3) Haque, Lee, and Staff
Fundamental principles, generalized coordinates, variational principles and Lagrange's equations, nonholonomic systems. Hamilton's equations, theory of small oscillations. Prerequisite: approval of department. (As arranged)

218 **Introduction to Continuum Mechanics** (3) Haque and Staff
Kinematics of a continuum, equations of motion, linear isotropic elastic solid, Newtonian viscous fluid, integral formulation of general principles, simple applications. Prerequisite: approval of department. (Fall)

221 **Theory of Elasticity I** (3) Staff
Introduction to Cartesian tensors, deformation, stress, constitutive relations for linear elasticity; formulation of boundary value problems; variational principles, torsion and bending of prismatical rods, plane problems. Prerequisite: Approval of department. (Spring)

222 **Theory of Elasticity II** (3) Staff
Application of integral transform and analytic function theory to solution of plane problems; elastic wave propagation. Three-dimensional elasto-statics. Prerequisite: ApSc 211, EngS 221. (Fall, odd years)

229 **Transformations in Materials** (3) Gilmore and Staff
Thermodynamics of multiphase systems, nucleation, crystal growth, solidification, precipitation, solution of moving boundary problems, spinodal decomposition, effects of stress on equilibrium, surface effects on transformations, martensite crystallography and thermodynamics. Prerequisite: EngS 231. (Spring, odd years)

231 **Structure and Transformations in Materials** (3) Gilmore and Staff
Structure of crystals, crystal binding, crystal defects, dislocations, solid solutions, phases, diffusion, phase transformations, deformation twinning, and martensite. Prerequisite: CE 140. (Fall, even years)

233 **Mechanics of Composite Materials** (3) Staff
Stress–strain relationship for orthotropic materials, invariant properties of an orthotropic lamina, biaxial strength theory for an orthotropic lamina. Mechanics of materials approach to stiffness, elasticity approach to stiffness. Classical lamination theory, strength of laminates. Statistical theory of fatigue damage. Prerequisite: approval of department. (Spring, odd years)

234 **Composite Materials** (3) Gilmore and Staff
Principles of composites and composite reinforcement. Micromechanics and failure, interface reactions in various composites, reinforcing materials. Structure of composites: fiber-reinforced polymers, filler-reinforced polymers, fiber-reinforced metals, directionally solidified alloys, dispersion-strengthened metals. Prerequisite: approval of department. (Spring, even years)

238 **Experimental Techniques in Materials Science** (3) Gilmore and Staff
Sample preparation. Optical microscopy. X-ray diffraction. Electron probe microanalysis. Scanning and transmission electron microscopy. Field ion microscopy. Prerequisite: CE 140. (Spring, odd years)

247 **Environmental Effects on Materials** (3) Gilmore and Staff
Aqueous corrosion, electrochemistry, electrochemical reactions, polarization, environmental factors, intergranular corrosion, stress corrosion, high-temperature corrosion. Kinetics and mechanisms of corrosion, oxidation, liquid metal corrosion, irradiation effects. Prerequisite: approval of department. (Fall, even years)

238 **Advanced Biomechanics** (3) Toridis, Bandak, Diggos
Historical overview of biomechanics and biomaterials. Fundamental concepts in mechanics as applied to the treatment of biological systems. Approaches to the mechanical analysis of the human structure under physiological and non physiological loading conditions. Constitutive laws for biological materials. Finite element applications. Prerequisite: EngS 203 and 218 or 221.

240 **Fracture Mechanics** (3) Jones, Liebowitz, and Staff
Fundamentals of brittle fracture, Griffith theory and extensions, mechanics of fracture. Linear elastic systems, plasticity considerations, fracture toughness. Engineering analysis, notch-strength analysis with limit approach, crack propagation laws, fatigue, fracture testing. Prerequisite: EngS 221 or CE 201. (Spring, even years)

241 **Deformation and Failure of Materials** (3) Gilmore and Staff
Elastic and plastic deformation, yield, dislocation theory, strengthening mechanisms, creep, polymers, fracture, transition temperature, microstructure, fatigue. (Fall, odd years)

242 **Materials Recycling and Recovery** (3) Gilmore and Staff
Techniques and technologies for recovering and reusing waste materials. Relationships of recycling and waste reduction to energy conservation and environmental impact; legal, economic, institutional, and environmental aspects of recycling and waste reduction. Prerequisite: approval of department. (As arranged)

244 **Introduction to Biomaterials** (3) Gilmore and Staff
Fundamentals of materials science and engineering applied to artificial materials in the human body. Topics include biocompatibility, techniques to minimize corrosion or other degradation of implant materials, and the use of artificial materials in various tissues and organs. Prerequisite: CE 166, EE 250. (Spring)

248 **Special Topics in Engineering Science** (3) Staff
Prerequisite: Approval of department. (As arranged)

249 **Special Topics in Materials Science** (3) Gilmore and Staff
Prerequisite: approval of department. (As arranged)

256 **Plasticity** (3) Lee and Staff
Introduction to the continuum theory of plastic deformation. Physical basis of rate-independent plasticity. Concepts of yield, strain hardening and softening, reverse yield, and cyclic plasticity. Constitutive equations describing plastic deformation. Prerequisite: EngS 215 or 218. (Spring, odd years)

257 **Theory of Vibrations** (3) Lee, Toridis, and Staff
Damped and undamped natural vibration, response of single- and multiple-degrees-of-freedom systems to steady-state and transient excitations, modal analysis, nonproportional damping and complex modes, variation formulation of equations of motion, discretization of structural systems for vibration analysis. Prerequisite: approval of department. (Fall)

258 **Structural Dynamics** (3) Sarkani, Toridis, and Staff
Vibration of continuous systems: membranes, beam plates, and shells; approximate methods of vibration analysis; methods of integral transform; analysis of nonlinear systems; wave propagation. Prerequisite: EngS 247 or approval of department. (Fall, odd years)

259 **Random Vibration of Structures** (3) Sarkani and Staff
Introduction to random processes, responses of linear structures to stationary and nonstationary random inputs. Structural responses to earthquakes, wind, boundary-layer turbulences, wind loads, etc. Failure analysis of structures under random loads. Prerequisite: approval of department. (Spring, even years)

270 **Theoretical Acoustics I** (3) Meyers and Staff
Basic acoustic theory in stationary and uniformly moving media; waves in finite spaces; sound transmission through interfaces; sound radiation from simple-solid boundaries, source and dipole fields; propagation in ducts; ray theory; clevares; elements of classical absorption of sound. Prerequisite: AS 251, ME 221. (As arranged)

271 **Random Process Theory** (3)
Random processes; stationarity and ergodicity; mean-square calculus; correlations and spectra; random processes in linear systems; mean-square estimation, prediction, and filtering; zero and level crossings and

distributions, applications in aerospace sciences. Prerequisite: approval of department. (As arranged)

273 **Time Series Analysis** (3) Myers and Staff
Harmonic analysis of random signals, auto- and cross-correlations and spectra, coherence, modern techniques for spectral estimation, including fast Fourier transform, maximum entropy, and maximum likelihood; bias and variability; randomly sampled data; digital filtering; applications. Prerequisite: EngS 271 or approval of department. (As arranged)

274 **Environmental Noise Control** (3) Staff
Introduction to the physical effects of noise and vibration on humans, practical sources of noise and their control. Building, ventilation-system, mechanical-equipment, aircraft, automobile, and truck noise. Factors affecting vibration levels and vibration control by structural design, damping, and isolation. Prerequisite: EngS 270, ME 215. (As arranged)

275 **Theoretical Acoustics II (3)** Myers and Staff
General theory of sound propagation in homogeneous media; viscous and heat conduction effects; inhomogeneous wave equation; sound radiation, sources, dipoles, quadrupoles; radiation from moving sources; scattering and diffraction of sound by obstacles; acoustics of inhomogeneous media; geometric acoustics. Prerequisite: EngS 270. (As arranged)

280 **Special Topics in Acoustics** (3) Staff
Current methods and problems in acoustics. Topics chosen from such areas as aerospace noise generation and control; instruments and procedures for acoustics measurements; and responses of structures, people and communities to noise. Prerequisite: approval of department. (As arranged)

282 **Computer-Aided Design** (3) Torvik and Staff
Fundamental concepts in the development of computational algorithms for the design of structures, machine components and assemblies, and other engineering systems. Representation of the design process and design specifications as a network of decision tables and logical flags. Optimization techniques and algorithms in design applications. Prerequisite: CSci 50, CE 210. (Fall)

283 **Application of Computer Graphics in Engineering** (3) Torvik and Staff
Automatic generation and display on CRT screen of geometrical shapes consisting of a grid of discrete points interconnected by user-selected geometric shapes. Automatic mesh generation, transformations, projections, and the concept of "hidden" lines. Interactive computer graphics applications. Prerequisite: CSci. 50 or equivalent; or concurrent registration EngS 284. (Spring)

284 **Numerical Methods in Engineering** (3) Torvik and Staff
Eigenvalue problems. Numerical solution of systems of equations and ordinary differential equations. Solution techniques for elliptic, parabolic, and hyperbolic partial differential equations. Numerical methods for solving finite element equations. Introduction to solution of fluid flow problems. Prerequisite: CE 117 or ME 117, or approval of department. (Fall)

285 **Finite Element Methods in Engineering Mechanics** (3) Torvik and Staff
Calculus of variations. Variational formulation of the finite element method. Weighted residual techniques. Computer implementation of the finite element method. Application to problems in heat transfer, stress analysis, fluid flow, and structural analysis. Prerequisite: approval of department. (Spring)

286 **Aircraft Structures** (3) Staff
Statics of thin-walled beams and panels; force interplay between stiffeners and skin in the analysis and design of stiffened thin-walled structures. Strength and stiffness of locally buckled stiffened structures. Design considerations. Critical evaluation of various design procedures. Prerequisite: approval of department. (As arranged)

288 **Advanced Finite Element Methods in Structural Mechanics** (3) Lee, Torvik, and Staff
Review of variational formulation of the finite element method. Formulation of various continuum and structural elements. Application to static and dynamic problems in elasticity, plasticity, large deflection, and instability of plates and shells. Recent developments in finite element methods. Prerequisite: CE 210, EngS 285. (Spring, odd years)

289 **Special Topics in Theoretical and Applied Mechanics** (3) Haque and Staff
Prerequisite: approval of department. (As arranged)

298 **Research** (arr.) Staff
Basic research projects as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

310 **Aeroacoustics** (3) Myers and Staff
General theory of aerodynamic sound generation and propagation. Lighthill's formulation of jet noise, similarity laws, supersonic and subsonic jet noise, boundary-layer noise, fan and compressor noise, helicopter noise, sonic booms. Current problems in aeroacoustics. Prerequisite: EngS 275 (As arranged)

311 **Nonlinear Acoustics** (3) Myers and Staff
Finite amplitude waves and waves in moving stratified media. Interaction between linear and nonlinear waves, wave propagation through nonlinear media, applications to transmission of sound through ducts with flow and absorbing walls. Prerequisite: approval of department. (As arranged)

314 **Advanced Numerical Methods** (3) Staff
Finite difference, finite element, and spectral methods for elliptic, parabolic, and hyperbolic differential-equation systems. Parallel- and array-processing techniques. Nonlinear equations. Prerequisite: ApSc 213, EngS 284 (As arranged)

315 **Nonlinear Mechanics of Continua** (3) Lee and Staff
Polar decomposition, invariance, isotropy, representation theorems for invariants and isotropic tensor functions. Deformation, kinematics, stress, balance principles. Principles for constitutive relations. Applications to nonlinear elasticity and non-Newtonian fluids. Prerequisite: Approval of department (Spring, even years)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Science candidates. May be repeated for credit.

COMPUTATIONAL SCIENCES

A new interschool program, the Master of Science in Computational Sciences, is under development. The proposed new program is planned to be offered through Columbian School of Arts and Sciences and the School of Engineering and Applied Science with the cooperation of the School of Business and Public Management and the School of Medicine and Health Sciences. The program is planned to include four required core courses—introduction to computational sciences, numerical methods, programming methods and algorithms, and simulation and visualization; four courses chosen from specialty tracks in computational physics, computational mathematics, and computational statistics and stochastic modeling; two elective courses; and a thesis or internship. Additional information can be obtained from Professor Kalvir Dhuga of the Physics Department.

COMPUTER SCIENCE

See **Electrical Engineering and Computer Science**.

COUNSELING/HUMAN AND ORGANIZATIONAL STUDIES

Professors D. Linkowski (*Chair*), E.W. Kelly, Jr., J.C. Heddesheimer, D.W. Dew, C.B. Hoare, M. Sashkin, D.R. Schwandt
Associate Professors N.E. Chalofsky, J. Garcia, M. Marquardt (*Visiting*), D.L. Fields, P.L. Hudson, R.B. Morgan
Adjunct Associate Professor R.A. Washington
Assistant Professors S.A. Marotta, S. Confessore, L.A. Horvath, T.J. Martin (*Research*), N.O. Berger, M.E. Langan (*Visiting*), B.Y. Cartwright (*Visiting*)
Adjunct Instructor P. Tschudi

See the Graduate School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Education Specialist, and Doctor of Education.

COUNSELING

201 Head Injury Rehabilitation (3) Garcia
Basic anatomy and physiology of the brain, causes, types, and severity of head injuries. Physical, cognitive, and psychological consequences of head injuries and rehabilitation strategies. Prerequisite, Cnsl 251 or 276. (Summer)

220 Special Workshop (arr.) Staff
Topics to be announced in the *Schedule of Classes*. May be repeated for credit.

251 Professional and Ethical Orientation to Counseling (3) Heddesheimer, Kelly, Marotta
The roles and functions of a professional counselor and the ethical standards that govern the profession. (Fall and spring)

253 Counseling Interview Skills (3) Heddesheimer, Garcia, Marotta
Acquisition of counseling skills common to all theories through lectures, demonstrations by faculty, role playing, and videotaping. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. Material fee, $25. (Fall, spring, and summer)

254 Psychosocial Adjustment (3) Hoare, Hudson
Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Fall)

255 Career Counseling (3) Staff
A consideration of theory, practice, and the body of information related to career counseling, choice, and development over the life span. Prerequisite: Cnsl 253, 259 (for counseling majors); permission of instructor is required for others. Material fee, $25. (Fall and spring)

257 Individual Assessment in Counseling (3) Marotta
Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors), Psyc 131 or Educ 212 or permission of instructor is required for others. Material fee, $25. (Fall)

259 Theories and Techniques of Counseling (3) Marotta, Kelly
An introduction to basic counseling and psychotherapeutic theories and associated techniques. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Fall, spring, and summer)

261 Group Counseling (3) Heddesheimer, Kelly, Linkowski, Marotta
Principles or group dynamics as related to interaction within groups. Techniques and practice in group counseling. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring and summer)

262 Elementary School Counseling (3) Kelly, Heddesheimer, Hudson
Guided study of the environmental and specialty elements of school counseling, with special attention to the principles and practices of elementary school counseling. Includes 20 hours of supervised prepracticum field activities in an elementary school counseling program. (Fall, spring, summer)

263 Social and Cultural Dimensions of Counseling (3) Staff
Basic sociocultural concepts in counseling theory and how they apply to the practice of the counseling profession. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Fall, spring, summer)

264 Value, Spiritual, and Religious Issues in Counseling (3) Kelly
The theoretical and practical intersection of counseling, psychotherapy, and mental health considerations with religion and spirituality. The clinically effective and ethically responsible integration of religion and spirituality into counseling. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring, alternate years)

265 Existential Counseling (3) Staff
Consideration of how existential concepts such as courage, authenticity, freedom, meaning, existential anxiety, and responsibility may be used to develop a philosophical approach to counseling, including discussion of the existential counseling relationship, diagnostic procedures, and intervention strategies. (Summer)

266 **Secondary School Counseling** (3) Kelly, Heddesheimer, Hudson
Guided study of the environmental and specialty elements for school counseling, with special attention to the principles and practices of secondary school counseling. Includes 20 hours of supervised prepracticum field activities in a secondary school counseling program. (Fall, spring, summer) Staff

267 **Foundations of Employee Assistance Programs** (3)
History, legislation, and foundations of practice of counseling in employee assistance programs. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. Staff

268 **Community Counseling** (3)
Description of community counseling settings, problems clients present, and consideration of appropriate intervention strategies. (Fall and summer) Staff

269 **Substance Abuse Counseling** (3)
Individual, group, family, and self-help counseling applied to substance abusers. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others.

271 **Family Counseling** (3) Kelly, Marotta
The family as a system: how it affects the client and how the client affects it. Didactic presentations, role playing, and work with simulated families. Prerequisite or concurrent registration: Cnsl 251 or 276 (for counseling majors); permission of instructor is required for others. (Fall)

272 **Human Sexuality for Counselors** (3) Hoare, Marotta
The purpose of this course is to increase the awareness and understanding of sexuality as it relates to counseling in contemporary society. Prerequisite or concurrent registration: Cnsl 251 or 276 (for counseling majors); permission of instructor is required for others. (Spring) Linkowski

274 **Counseling Older Persons** (3)
Special considerations and counseling emphases in regard to the life transitions and role changes that occur for older persons. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others.

275 **Living and Dying: A Counseling Perspective** (3) Tschudi, Washington
Survey of fundamental psychosocial issues surrounding grief, loss, and life-threatening illness. Topics include AIDS, suicide, multiple loss, caregiver grief, spirituality, and cross-cultural issues.

276 **Foundations of Rehabilitation Counseling** (3)
Survey of history, philosophy, basic principles, legislation, roles, and services. Visits to selected field sites. (Fall)

278 **Disability and Case Management** (3) Linkowski and staff
Case management services for persons with physical, mental, and emotional disabilities. (Spring)

280 **Job Placement and Supported Employment** (3) Linkowski and staff
Job development and modification; placement of persons with disabilities. (Spring)

281 **Medical and Psychosocial Aspects of Disabilities** (3)
Chronic and traumatic disorders with rehabilitation and psychosocial implications. (Fall)

284 **Practicum in Counseling** (1)
Part of a two-semester clinical experience for degree candidates in counseling. Prerequisite: Cnsl 255, 257; prerequisite or concurrent registration: Cnsl 285. (Fall, spring, and summer) Staff

285 **Internship in Counseling I** (2)
Part of a two-semester clinical experience for degree candidates in counseling. Material fee, $50. Concurrent registration: Cnsl 284. (Fall, spring, and summer) Staff

286 **Internship in Counseling II** (3 to 6)
Part of a two-semester clinical experience for degree candidates in counseling. Material fee, $50. Prerequisite: Cnsl 285. (Fall, spring, and summer) Staff

293–94 **Research and Independent Study** (1 to 3)
Individual research under guidance of a staff member. Program and conference arranged with an instructor. (Academic year) Staff

298–99 **Thesis Research** (3–6)

344 **Advanced Group Counseling** (3) Kelly, Marotta
A post-master's course on interpersonal process groups, with didactic, experiential, and supervisory components. Prerequisite: Cnsl 261 or equivalent, permission of instructor is required. (Spring and summer)

352 **Organization and Administration of Counseling Services** (3) Staff
Principles and procedures for designing and implementing counseling services. Admission by permission of instructor. (Spring)

353 **Work, Identity, and Adult Development** (3) Hoare
The influence of work on identity, intellectual and personality development, and other developmental attributes. (Fall)

357 **Doctoral Practicum in Counseling** (2) Kelly and Staff
Experiential learning of advanced counseling and counseling related competencies through direct, supervised participation in group work, research, teaching, and/or consultation. Admission by permission of instructor. (Fall and spring)

358 **Advanced Theories of Counseling** (3) Kelly
Current research on counseling and psychotherapy process and outcome; critical analysis of theory with applications for practice and research. For Ed.S. and Ed.D. degree candidates in the field of counseling. Admission by permission of instructor. (Fall)

359–60 **Doctoral Internship in Counseling and Counselor Supervision** (2–2) Kelly

361 **Seminar: Counseling** (arr.) Lankowski

390 **Predissertation Seminar** (3 to 6)

391 **Dissertation Research** (arr.) Staff
Prerequisite: Cnsl 390.

HUMAN RESOURCE DEVELOPMENT

220 **Special Workshop** (arr.) Staff
Topics to be announced in the *Schedule of Classes*. May be repeated for credit.

236 **Technology and Human Resource Development** (3) Staff
How technology can best be utilized in the HRD environment. Discussion of CBT, use of the Internet for instruction, and distance learning techniques.

239 **International and Multicultural Human Resource Development** (3) Marquardt
The impact of culture and globalization on U.S. and international HRD programs and practices. Adult learning and organizational change approaches that develop and utilize the synergy of workforce diversity. Successful international HRD programs.

263 **Foundations of Human Resource Development** (3) Staff
How individuals and groups learn and interact within organizations and how organizations function and learn. Motivation, group dynamics, systems theory, organizational culture, and change.

264 **Design of Adult Learning in Human Resource Development** (3) Staff
Designing and implementing training programs. Topics include instructional design techniques, designing effective programs, program planning and marketing techniques, and conducting needs assessments and evaluations of training programs.

269 **Organization Diagnosis for HRD** (3) Staff
The assessment of organizational conditions, including collection and interpretation of information, operations, and problems (human, structural, and systemic). Course participants collect and analyze data to provide solutions to enhance organizational effectiveness.

272 **Internship in Adult Learning and Human Resource Development** (3 to 6) Staff
Supervised experience in selected areas of human resource development and adult education. Admission by permission of instructor.

274 **Work Groups and Teams in Organizations** (3) Staff
Exploration of the nature of work groups and teams as they are utilized in organizational settings. Group and team dynamics, facilitating and leading skills, and group roles and boundaries.

277 **Explorations in Innovative Learning** (3) Chaloitsky
Specialized learning techniques in non-traditional and traditional settings. Top-
ics are chosen in consultation with students and include areas such as outward
bound type activities and creative arts as media for effective adult learning.

281 **Adult Learning** (3) Berger, Confessore, Hess
Premises and theories used to meet learning needs of adults. Overview of var-
ous learning theories and the impact of various stages of adult development on
learners. Topics including self-directed learning, accommodating individual
learning needs, and creation of effective learning techniques.

282 **Strategies for Adult Learning** (3) Berger, Confessore
Theoretical and practical components of instructional delivery in various set-
tings, including corporate training environments. Students design and imple-
ment teaching strategies, such as concept attainment, group investigation, and
creative thinking.

284 **Assessing Impact of HRD Efforts** (3) Staff
Knowledge and skills needed to evaluate the impact and return on investment
of HRD efforts. Focus on how to plan and conduct systematic evaluations of
HRD efforts, including the choice, development, and use of various tools for
measuring individual, group, and organizational change.

286 **Issues in Human Resource Development Programs** (3) Hervey
Current issues and topics of importance in the field. Students gather data and
analyze key topics associated with areas such as globalization, diversity in the
workplace, organizational development, and ethics.

287 **Strategic Human Performance Processes** (3) Staff
Overview of systematic coordination and use of HR management concepts as
integral element of organizational strategy. HRD implications of these tools
with an emphasis on building the HR system.

289 **Consulting Skills in Human Resource Development** (3) Staff
Introduction to the concepts, methods, and skills required for effective consul-
tation in organizations, as either an internal or an external consultant. Meeting
the human needs in organizations, while improving performance and produc-
tivity. Students undertake a consulting project in an organization. Prerequisite:
HRD 269.

290 **Organizational Learning** (3) Schwandt
Learning in an organizational context. Processes through which the organiza-
tion as a system learns, unlearns, changes, and disseminates information. Or-
ganizational learning theories address the processes and barriers of gathering,
using, developing, and retaining knowledge in organizations.

293–94 **Research and Independent Study** (1 to 3) Staff
For students who have a specific interest in a topic related to HRD. An in-depth
project is completed under the guidance of a faculty member. The course is
arranged individually with an instructor.

299–300 **Thesis Research** (3–3) Staff

421 **Seminar: Advanced Issues in Human Resource Development** (3) Sankaran

427 **Seminar: Applied Research in Human Resource Development** (3) Sankaran

453 **Work, Identity, and Adult Development** (3) Bigus
Same as Cnsl 453.

463 **Foundations of Human Resource Development** (3) Staff
Relationships between individuals and their interactions in groups within an
organizational context. Overview of theoretical foundations of key areas asso-
ciated with HRD. Motivation, systems theory, group dynamics, organizational
culture, and learning.

474 **Work Groups and Teams in Organizations** (3) Staff
Theoretical understanding and practical considerations of working with groups
and teams. Group dynamics, facilitating and leading groups, and team effectiveness.
Group facilitation techniques across different group settings and environments.

479 **Practicum in Adult Learning Programs** (3 to 6) Staff

490 **Predissertation Seminar** (3 to 6) Staff

491 **Dissertation Research** (arr.) Staff
Prerequisite: HRD 390.

CRIME IN COMMERCE and CRIMINAL JUSTICE

See Forensic Sciences.

EAST ASIAN LANGUAGES AND LITERATURES

The Columbian School of Arts and Sciences Department of East Asian Languages and Literatures offers the following courses toward the concentration in Chinese language and literature in the field of East Asian Studies. The field leads to the Master of Arts offered by the Elliott School of International Affairs. See East Asian Studies and the Elliott School of International Affairs.

CHINESE

271–72 **Poetry of the Tang and Song Periods** (3–3) Chaves
Reading of works of leading poets. Discussion of content and style. Prerequisite: Chin 109 or equivalent. (Alternate academic years)

273 **Chinese Drama** (3) Staff
Readings of plays by Guan Han-qing, Ma Zhi-yuan, and others. Prerequisite: Chin 109 or equivalent.

277–78 **Prose Narratives of the Song, Ming, and Qing Periods** (3–3) Staff
Short stories of the Song period. Selected readings of Ming-Qing novels. Historical development and stylistic traits. Prerequisite: Chin 107 or equivalent. (Alternate academic years)

299–300 **Thesis Research** (3–3)

EAST ASIAN STUDIES

Program Committee: B. Dickson (*Director*), A. Bowie, J. Chaves, Y.C. Kim Renaud, J. Koppel, E. McCord, S. McHale, D. Shambaugh, M. Whyte, D. Yang, A. Zhao

Master of Arts in the field of East Asian studies—The Elliott School of International Affairs offers a multidisciplinary program leading to the Master of Arts in the field of East Asian studies.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Entering students who have not completed undergraduate course work in modern Chinese and Japanese history must take equivalent course work at the beginning of their program.

Required: the general requirements stated under the Elliott School of International Affairs. The program requires a minimum of 36 credit hours, with a thesis or non-thesis option. Students electing the non-thesis option must complete a minimum of one research seminar requiring the preparation of a substantial research paper. Students electing the thesis option will complete 6 credit hours of thesis research. Students are required to integrate their course work into at least three fields and successfully complete a capstone policy project during their last spring semester in residence. Each student's program of study must include course work on more than one East Asian country, as well as course work in a minimum of three of the following disciplines: economics, history, literature, political science, and sociology. Students should consult the program guidelines available from the Elliott School about specific courses in these fields of study. Students may choose a non-Asia-related field (e.g., international business) after approval in advance by the program director. More details are provided in the program guidelines available in the Elliott School.

Students must demonstrate an oral and reading knowledge of Chinese, Japanese, or another approved Asian language by passing a tool examination during their final 18 hours of residence. Six hours of language course credit may apply toward degree requirements.

Concentration in *Chinese language and literature*—a separate 40-credit-hour program, with a required thesis, is available for students wishing to pursue a concentration in Chinese language and literature. Students must take 12 credit hours of Chinese literature and pass a Master's Comprehensive Examination in this major field. They must also take 6 hours of history courses and 6 hours of additional courses that pertain to East Asian studies.

ECONOMICS

Professors J. Aschheim, J.L. Gastwirth, M.A. Holman, R.M. Dunn, Jr., S.E. Haber, R.S. Goldfarb, A.M. Yezer, J.J. Cordes (*Chair*), J. Pelzman, J.E. Kwoka, R.P. Trost, B.L. Boulier, H.S. Watson, M.D. Bradley, J.R. Millar, S.C. Smith, A. Klamer (*Research*), P. Labadie

Adjunct Professors T.F. Carroll, P. Swamy, J. Hardt, E.H. Solomon, D.J. Rousslang, K. Flamm, S.N. Kirby

Associate Professors R.F. Phillips, A.S. Malik, F.L. Joutz, M.O. Moore, S.M. Suranovic, S. Joshi

Adjunct Associate Professor M.A. Baily

Assistant Professors V. Fon, N. Vonortas, S. Reeves, A. Zhao, E.M. Feasel, S. Jain, C.M. Snyder, D. Ribar

Master of Arts in the field of economics—Prerequisite: (1) a Bachelor of Arts degree with a major in economics or with course work in economics that includes intermediate microeconomic and macroeconomic theory (equivalent to Econ 101, 102 or 217–18), an understanding of basic calculus, equivalent to Math 31–32. Applications are accepted for the fall semester only.

Required: the general requirements stated under Columbian School of Arts and Sciences, including (1) Econ 203–4, 205, and 275; (2) 12 additional credit hours to be selected from other third-group economics courses; (3) a Master's Comprehensive Examination in economic theory, and (4) either a thesis (Econ 299–300) or 12 credit hours selected from additional third-group economics courses. In some cases, up to 6 credit hours in courses outside the Department may be substituted for certain of the above requirements when it is deemed clearly important to the candidate's area of study.

Five-Year Bachelor of Science-Master of Arts in the field of economics—See the Undergraduate Programs Bulletin.

Five-Year Bachelor of Science (Systems Analysis and Engineering)-Master of Arts in the field of economics—See the Undergraduate Programs Bulletin.

Doctor of Philosophy in the field of economics—The Ph.D. program involves study in two sequential units. Unit I includes satisfactory completion of required course work and passing the General Examination. This first unit must be concluded within five years after entry into the program. Upon successful completion of Unit I, students are considered for admission to Unit II, the dissertation stage, which must be completed within five years after entry. In all cases, however, the student is expected to complete the doctorate within eight years after admission. Students admitted to the second unit will be recommended by the Department of Economics for the Master of Philosophy degree.

Students must meet the general requirements stated under Columbian School of Arts and Sciences. For Unit I, the requirements include Econ 203, 204, 205, 206, 217, 218, and 275, plus 27 additional credit hours of approved graduate course work, and passing the General Examination in microeconomic theory, macroeconomic theory, and two other fields selected by the student and approved by the doctoral program committee. Examinations are given in the following fields: econometrics, economic development, environmental and natural resource economics, health economics, industrial organization, international economics, labor economics, monetary theory and policy, public finance, regional and urban economics, and Soviet and East European economics.

Examinations: the field examinations that constitute the General Examination are given at least two times per year. The requirements for the microeconomic and macroeconomic theory examinations must be met before any other field examinations may be taken. Students are strongly advised to take the microeconomic and macroeconomic theory examinations within two years of entering the program. To pass the General Examination, students must earn a grade of "satisfactory pass" or better in the field examinations in microeconomic or macroeconomic theory and in one of the other two field examinations, and no grade below "bare pass." Two of the field examinations may be taken at the same time with the approval of the department and the dean. No further opportunity to retake examinations is permitted. Substitution of a field examination (in an area not originally chosen by the student) to satisfy the requirements of the General Examination is equivalent to taking a field examination a second time. Students should consult with the professors responsible for their fields and notify the department two months in advance of their intention to take the examinations. If such notification is not given sufficiently in advance, it may not be possible to sit for the examination.

For Unit II, the requirements include formulation of an acceptable dissertation proposal, completion of a dissertation that demonstrates the candidate's ability to do original research, and 24 hours of additional graduate course work, of which at least 12 hours must be dissertation research. Students, including those who have an accepted dissertation proposal, must enroll in a dissertation proposal seminar (Econ 397) in the first semester after promotion to Unit II. Satisfactory performance in the seminar will be equivalent to 3 credit hours of Unit II course work. In cases where knowledge outside the discipline of economics is critical to the student's research field, up to 6 credit hours in Unit II may consist of required courses outside the Economics Department.

Departmental prerequisite: Graduate courses in economics (except 214, 217–18, 219, 221–22, 247, 249, 280, 283, 284) are designed for graduate students in economics. Graduate students in other disciplines may register for third-group courses after having completed Econ 217–18, or 218 and 219, or 101 and 102, unless the course description indicates that these prerequisites have been waived. Intermediate-level micro- and macro courses taken elsewhere usually satisfy this requirement, but introductory or first-year courses do not. In addition to these prerequisites and any others specific to the particular course, calculus is required in some sections of graduate economics courses.

Courses at the 300 level are offered as the demand warrants and may be repeated for credit.

202 **History of Economic Thought** (3) Staff
Critical analysis and interpretation of the development of economic theory from Plato through the formulation of the Neoclassical Synthesis paradigm and contemporary revisions of the Neoclassical Synthesis. (Fall)

203–4 **Microeconomic Theory** (3–3) Fon, Joshi
Econ 203: Demand, production, cost theory; prerequisite: Econ 101 or equivalent. Econ 204: Market structure, welfare, general equilibrium; prerequisite: Econ 203. (Academic year)

205 **Macroeconomic Theory I** (3) Bradley, Joutz, Labadie
Alternative theories of income, employment, and the price level; fiscal and monetary policy impacts; the role of expectations in the economy. (Spring)

206 **Macroeconomic Theory II** (3) Bradley, Joutz, Labadie
Continuation of Econ 205. Extensions of alternative models of income determination; application of analytic frameworks to the U.S. economy; examination of uncertainty and policy strategy. (Fall)

208 **National Income, Product, and Productivity** (3) Staff
Output, input, and productivity relationships by industry; income, outlay, flow-of-funds, and balance sheets by sector; uses of accounts for analysis and projections. (Fall)

214 **Survey of Mathematical Economics** (3) Fon
Primarily for graduate students in fields other than economics. Students in economics should consult the instructor before taking this course. Differentiation, partial differentiation, and economic optimization problems; comparative statics; input–output analysis; difference, differential equations and economic applications. Prerequisite: one semester of calculus and Econ 217–18.

215–16 **Mathematical Economics** (3–3) Fon
Formulation and application of mathematical models in economic theory. Prerequisite: a one-year calculus sequence. Open to undergraduates with permission of instructor. (Academic year)

217–18 **Survey of Economics** (3–3) Goldfarb, Holman, Watson, Bradley, Fon, Joutz, Malik, Phillips
Intermediate-level microeconomic theory (Econ 217) and intermediate-level macroeconomic theory (Econ 218) for graduate students in fields other than economics. (Econ 217 and 218—fall and spring)

219 **Managerial Economics** (3) Beutler, Fon, Goldfarb
Intermediate microeconomic theory, with emphasis on production and costs, market structure and pricing, risk analysis, and investment theory and capital budgeting. Credit cannot be earned for both Econ 217 and 219. (Fall and spring)

221–22 **Economics Applied to Public Policy: Theory and Method** (3–3) Cordes
An extension of microeconomic welfare analysis to the study of contemporary policy issues. Resource allocation decisions in the public sector; models of

individual choice in policy analysis; and policy aspects of production, cost and organizational decision making. Primarily intended for students in fields other than economics. Prerequisite: Econ 217. (Academic year)

223–24 **Monetary Theory and Policy** (3–3) Aschheim
Theory of monetary policy within the framework of contemporary American central banking. (Academic year)

233 **Urban and Rural Development Policies** (3) Staff
Review of urban and rural development strategies in the LDCs. Theories and experiences of land reform, peasant cooperatives, small-farm technology, rural–urban linkages, and planning a service network. (Fall)

237 **Economics of the Environment and Natural Resources** (3) Mäler
Analysis of public policy problems relating to the environment and natural resources development and management. Prerequisite: Econ 217. (Spring) Staff

239 **Economics of Defense** (3)
Economic analysis applied to national security planning and objectives. Analysis of defense establishment problems, including manpower, the defense industry base, procurement policy. (Spring)

241–42 **Labor Economics** (3–3) Goldfarb, Kwo
Theory of wages and employment, analysis of labor supply and demand. Analysis of unemployment, unions, wage regulation. Econ 241 is prerequisite to Econ 242. (Academic year)

245–46 **Industrial Organization** (3–3) Kwoka, Snyder
Econ 245. Economic theory and evidence regarding industrial market structure, conduct, and economic performance. Econ 246. Economic issues in antitrust and government regulation of the U.S. economy. Econ 245 is prerequisite to Econ 246. (Academic year)

248 **Health Economics** (3) Bale
Demand for medical care; organization of the health care delivery industry; policy issues on regulation, efficiency, and allocation of health care services. (Fall)

249 **Industrial Organization—The Telecommunication Industry** (3) Brock
Principles of industrial organization, welfare economics, and theories of regulation, in theory and in practice. Market power, merger analysis, vertical relationships, entry, and regulation of price and lines of business. The structure, market performance and business practices of the telecommunication industry. Prerequisite: Econ 101, 217 or equivalent. Offered off campus only. Smith, Ja

251 **Development Economics I** (3)
The application of economic theories, empirical studies, and policy issues to economics problems of developing countries, with an emphasis on macroeconomic aspects. Topics include income distribution and poverty, urban migration, peasant and agrarian efficiency, fertility preference, industrial planning, multinational enterprise, and international trade policy. (Fall and spring) Sr

252 **Development Economics II** (3)
Continuation of Econ 251, with an emphasis on macroeconomic aspects. Topics include new theories of economic growth and general theories of the development process, macroeconomic stabilization, financial repression and deepening, debt and aid policies, and applied economy-wide policy models. (Fall and spring) Vergara

255 **Economics of Technological Change** (3)
Economics of research and development: innovation and growth, the role of government in the development and use of new technology. (Spring) Yas

257 **Regional Economics** (3)
Study of regional planning and growth models, including input–output programming, and econometric models used by planning agencies; analysis of interregional production, trade, migration, firm location, and pricing. (Fall) Yas

258 **Urban Economics** (3)
Analysis of spatial relationships among economic activities within an urban area including the urban land, labor, and housing markets, urban transportation models, fiscal relationships among jurisdictions. Prerequisite: Econ 2[illegible] permission of instructor. (Spring)

263 **Public Finance I** (3) Cordes, Watson
Theoretical and empirical analysis of the economic role of the public sector and the effects of public expenditures on resource allocation and income distribution. Topics include public goods, externalities, social insurance, and benefit–cost analysis. (Fall)

264 **Public Finance II** (3) Cordes, Watson
Theoretical and empirical analysis of the effects of taxes and transfers on the allocation of resources and income distribution. Topics include partial and general equilibrium models of tax incidence, effects of taxes on labor supply, saving, and portfolio choices of households and on investment and financing decisions of firms. (Spring)

267 **Economies of the Former Soviet Union and Eastern Europe** (3) Pelzman
Analysis of current economic problems. Topics include industrial policies and investment cycles in planned economies, trade relations between the former Soviet Union and Eastern Europe, and comparative analysis of economic policies in the former Soviet Union, Eastern Europe, and less-developed market economies. Admission by permission of instructor. (Fall)

268 **Economies of the Former Soviet Union and Eastern Europe in Transition** (3) Pelzman
Analysis of the transition from centrally planned market economies in the former Soviet Union and Eastern Europe. Admission by permission of instructor. (Spring)

269–70 **Economy of China** (3–3) Staff
Econ 269. Analysis of organization, operation, policies, and problems. Development of the economy since 1949. Econ 270. Examination of critical problems of development. Prerequisite to Econ 270. Econ 269 or permission of instructor. (Academic year)

271 **Economy of Japan** (3) Staff
Analysis of Japanese economic institutions and their contribution to Japan's development. (Fall)

275 **Econometrics I: Introduction** (3) Trost, Phillips
Single-equation models of economic behavior. Statistical methods for testing economic hypotheses and estimating parameters. Topics include heteroscedasticity, serial correlation, and lagged dependent variables. Prerequisite: Econ 123. Some exposure to matrix algebra is helpful, but not required. Same as Stat 275. (Fall and spring)

276 **Econometrics II: Simultaneous-Equation Models** (3) Trost, Phillips
Simultaneous-equation models of economic behavior. Optional topics are maximum-likelihood estimation, limited dependent variables, and quantum-response models. Prerequisite: Econ 275. Recommended: a course in matrix algebra. Same as Stat 276. (Spring)

277 **Laboratory in Applied Econometrics** (3) Trost, Ioutz, Phillips, Ribar
Application of econometric theory. Use of econometric software. Each student is required to write an empirical research paper. Topics vary; may be repeated for credit provided the topic differs. Prerequisite: Econ 275 or, with the permission of the instructor, Econ 123.

278 **Economic Forecasting** (3) Ioutz
Introduction to the theoretical and applied aspects of economic forecasting. Topics include the role of forecasting, univariate time-series analysis, single equation models, multiple series models, and evaluation of forecasts. Prerequisite: Econ 275 or equivalent or permission of instructor. (Spring)

280 **Survey of International Economics** (3) Moore, Suranovic
Introductory-level international trade and finance, primarily for Elliott School students. Topics include the economic effects of trade liberalization and protection, exchange rate determination, and macroeconomic policies in an open economy. Prerequisite: Econ 11–12

281 **International Trade Theory** (3) Moore, Pelzman, Suranovic
International trade theory, including alternative models of the gains from trade and evaluations of the new justifications for protectionism, and analysis of commercial policy, factor flows, and trade and investment with multinational corporations. Prerequisite: most sections require calculus or permission of instructor. (Fall)

282 International Finance and Open-Economy Macroeconomics (3) Dunn, Pelzman, Reeves
International finance, including alternative models of balance of payments behavior and adjustment, payments accounting, exchange markets, and alternative exchange-rate regimes. (Spring)

283 Survey of International Trade Theory and Policy (3) Dunn, Moore, Pelzman, Suranovic
For graduate students in fields other than economics. Survey of international economics and policy; application of comparative advantage and other arguments for trade; impact of trade on a domestic economy; new arguments for protectionism; regional trading blocs. (Fall and spring)

284 Survey of International Macroeconomics and Finance Theory and Policy (3) Dunn, Reeves, Moore, Pelzman, Suranovic
For graduate students in fields other than economics. Open-economy macroeconomics, international finance; balance of payments accounting; exchange markets; alternative models of balance of payments determination and adjustment; behavior of flexible exchange rate systems. (Fall and spring)

285–86 Economic Development of Latin America (3–3) Flamm
Econ 285. Diversity of structures of Latin American economies; import substituting industrialization; inflation; problems of underemployment and income distribution. Econ 286. Structure of trade, protection, exports, and economic development; regional and global economic integration; foreign investment, multinational enterprise, and technology transfer. (Academic year)

290 Principles of Demography (3) Boulier
Introduction to basic demographic perspectives and data; methods for analysis of population size, distribution, and composition; determinants and consequences of population trends. Departmental prerequisite waived. Same as Geog Soc/Stat 290. (Fall)

291 Methods of Demographic Analysis (3) Boulier
Basic methods for analysis of mortality, natality, and migration; population estimates and projections; estimation of demographic measures from incomplete data. Departmental prerequisite waived. Same as Geog/Soc/Stat 291 (Spring)

295 Special Topics (3) Staff
Topics vary, depending on current issues of interest and faculty availability. (Fall and spring)

298 Reading and Research (3)
Limited to master's degree candidates.

299–300 Thesis Research (3–3)

305 Seminar: Macroeconomics (3) Bradley, Joutz, Labadie
Selected topics in macroeconomics. Prerequisite: Econ 205.

310 Economic Methodology (3) Goldfarb
Methodology of economics, review of selected issues and topics. Prerequisite: 6 credit hours of graduate courses in economic theory

312 Seminar: Price Theory (3) Ioa
Selected topics in price theory

315 Seminar: Mathematical Economics (3)
Intensive study of selected topics, including economic activity analysis, and uncertainty, and other topics of current interest. Prerequisite: Aschheim,

321 Seminar: Monetary Theory (3) Goldfarb, Kw
Recent developments in monetary theory

341 Seminar: Labor Economics (3) Kwoka, Sa
Current problems in theory and policy

345 Seminar: Industrial Organization (3)
Review of recent literature and current policy issues. Admission by permission of instructor

348 Seminar: Health Economics (3) Staff
Advanced topics in health economics. Prerequisite: Econ 248 or permission of instructor

351 Seminar: Economic Development (3) Cuadras, Ba
Analysis and review of recent theoretical work and/or selected topics of current policy interest. Prerequisite: Econ 251 and 252 or permission of instructor

363 Seminar: Public Finance (3)
Selected topics of current interest

467 Seminar: Formerly Centrally Planned Economies (3) Pelzman
Advanced analysis of the transition to markets in formerly centrally planned economies. Prerequisite: Econ 267 and 268, or permission of instructor.

490 Seminar: International Economic Theory (3) Dunn, Pelzman, Moore, Suranovic
Primarily for doctoral students. Examination of recent contributions in this field.

491 Seminar: International Economic Policy (3) Staff
Topics selected from current significant policy problems.

497 Dissertation Proposal Seminar (3) Staff
Limited to Doctor of Philosophy candidates in Unit II. Critical analysis of current research. Formulation of a dissertation proposal and development of dissertation research strategies.

498 Advanced Reading and Research (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

499 Dissertation Research (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

EDUCATIONAL LEADERSHIP

Professors I.G. Boswell, D.A. Moore, S.R. Paratore, R. Ferrante, I.A. Greenberg, J.D. Fife, D.H. Holmes (*Chair*), M. Worth, L.E. Powell, G. Confessore, R.C. Rist, E.B. Howerton, Jr., I.C. Rotberg (*Research*)
Adjunct Professors D. Iwamoto, S.A. Schulman, G.P. Kearsley, N.J. Colletta, T.H. Stanton, M.H. Alleyne, T.R. Wolanin
Associate Professors W.F. Lynch, J. McDonald, H.I. Willett, M.H. Futrell, R.O. Mueller, C.B. Stapp, G.B. Jackson
Adjunct Associate Professor V.J. Catanzelli
Assistant Professor P. Koenig
Adjunct Assistant Professor E.M. Evans
Adjunct Instructors E.M. Willenbecher, S.C. Ades

See the Graduate School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Master of Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education.

Departmental prerequisite: A bachelor's degree from an accredited college or university is prerequisite to all 200-level courses. With permission of the instructor, undergraduates in their senior year may enroll in 200-level courses.

201–2 International Education (3–3) Moore
A study of a selected sample of foreign education systems as they reflect culture, history, development, values, people, and current changes. Research techniques to develop a global frame of reference. International resources, organizations, and resources unique to the Washington area are utilized. (Summary)

203 Comparative Education (3) Alleyne
A systematic investigation of the educational structure and practices of selected representative school systems throughout the world. Emphasis on development of a methodology for comparative study. (Fall)

205 International Experiences (1 to 6) Staff
Travel to a foreign country for specific study and research. Admission by permission of the instructor.

206 American Education: An In-Depth Overview for International Students (3) Moore
The nature and organization of American education in a social, historical, and philosophical context; understanding contemporary change and how it is reflected in the education system. (Spring)

207 Instructional Materials, Media, and Resources (3 to 6) Staff
Review of technological contributions to education. Examination of current and emerging developments. Framework for study of selection, utilization, integration, and evaluation of audiovisual media in the teaching-learning process.

208 Human Development (3) Staff
Consideration of human development and behavior throughout the life span, emphasis on practical implications of relevant interdisciplinary research. (Spring and summer)

209 **Child Development** (3) Staff
Interdisciplinary approach to child development and behavior. Practical implications of research in disciplines contributing to knowledge about childhood. (Fall)

210 **Adolescent Development** (3) Staff
Interdisciplinary approach to adolescent development and behavior. Practical implications of research in disciplines contributing to knowledge about adolescence. (Spring)

212 **Quantitative Methods I: Introduction to Measurement and Data Analysis** (3) Holmes, Mueller, Paraton
First-level course in social science research methods. Overview of basic measurement concepts, educational and psychological testing, and descriptive data analysis (measures of shape, location, and dispersion; correlation). (Fall, spring, and summer)

214 **Western Educational Thought** (3) Boswell
The evolution of education and schooling in response to philosophical developments and historical contexts. From the Enlightenment to the present with concentration on the American experience. (Fall and spring)

216 **Advanced Study of the History of Education** (3) Boswell
Individually planned program of study on topic of student's interest. Prerequisite: Educ 214 or the equivalent.

217 **Advanced Study of the Philosophy of Education** (3) Boswell
Individually planned program of study on topic of student's interest. Prerequisite: Educ 214 or the equivalent.

218 **Social Foundations of Education** (3) Boswell, Jackson, Wolanin
How social, economic, and political forces influence schooling, and how education affects the social, economic, and political spheres of public life.

220 **Experimental Course** (arr.) Staff
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

222 **Museum Studies** (3) Staff
An overview of the museum as an environment for learning, considering the influence of institutional history and organizational structure on the museum's mission of serving the public. Admission by permission of instructor. (Summer)

223 **Museum Audiences** (3) Staff
A survey of the museum's diverse audience, emphasizing implications for effective programming, with attention to audience research. Admission by permission of instructor. (Fall)

224 **Communication Skills** (3) Staff
Theory of and practice in the development of communication skills in the museum. Educational concepts; teaching strategies and techniques; institutional liaison and group process. Admission by permission of the instructor. (Summer)

226 **Internship and Seminar in Museum Education** (6) Staff
Four-day, a-week placement in education departments in area museums, supervised by George Washington University faculty. On-campus seminar. Topics: grant proposal writing. Admission by permission of instructor. (Spring)

227 **Museum Evaluation** (3) Staff
Evaluation and research methods appropriate to the museum setting. Review of research on museum audiences, designing program and exhibit evaluations. Admission by permission of instructor. (Summer)

228 **Selected Topics in International Education** (3) Staff
Investigation of historical development of international education; research in selected topics of general importance to the field of international education. Admission by permission of instructor. (Fall)

229 **Cross-Cultural Studies of Human Development** (3) Staff
Theories of life-span development and of culture are the basis for the cross-cultural study of selected topics in human development. (Fall)

240 **Managing Computer Applications** (4) Staff
For managers and prospective managers in education and human services who are concerned with the automation of their operations. Basic principles needed to design, implement, and manage an information system. Prerequisite: permission of instructor. (Spring and summer)

231 **Educational Hardware Systems** (3) Lynch
Design and implementation of educational hardware systems, including computers, videodisks, networks, video systems, and ITV.

232 **Applying Educational Media and Technology** (3) Lynch
Theory and practice of educational technology. Key characteristics of different media, principles of application, and issues concerning their appropriate use.

233 **Supervised Experience in Education and Human Development Services** (3 to 6) Staff
Admission by permission of instructor. (Fall and spring)

234 **Computers in Education and Human Development** (3) Lynch
The research and practice surrounding the use of computers in educational and training settings. Students will acquire the practical knowledge necessary to the development and evaluation of computer-related curricula through projects and case studies.

235 **Design and Implementation of Educational Software** (3) Lynch
Theory and practice of creating educational software, psychological basis of using software in learning; instructional programs; authoring tools; artificial intelligence applications; interactive media. Students design, program, and evaluate an educational program. Prerequisite: Educ 232 or permission of instructor.

240 **Proposal Writing** (3) Ferrante
The preparation of proposals for educational, business, and industrial applications, including those submitted for funding. Many styles and formats are illustrated. Each student will prepare a proposal in cooperation with an organization or agency. (Fall and summer)

242 **Fundamentals of Educational Administration** (3) McDonald
Current leadership theory and systems behavior in the context of administrative practice in educational settings. Key elements of leadership and management. The impact of context, culture, power, politics, change, communications, and organizational learning on administration. (Fall)

243 **Human Relations in Educational Management** (3) McDonald
Application of current theory and research findings in human relations to staff motivation, change, conflict management, and communication techniques for working with individuals and groups within organizations. (Summer)

244 **Managing Multicultural Environments** (3) McDonald
Application of multicultural research in identifying key elements for managing diverse school environments, communicating with families, planning professional development activities, and increasing student learning. (Spring)

246 **Administrative Issues in Education** (3) McDonald
The impact of major social, political, economic, and education issues on the role of school leaders and the delivery and quality of programs and services. (Spring)

248 **Supervision and Evaluation of Instruction** (3) Powell
The roles and functions of educational leaders in the areas of curriculum, staff development, instructional supervision, and teacher evaluation. Individual and group interactive skills for effective communication. Theory and practice to increase teacher effectiveness and improve student learning through supervisory strategies. (Fall)

250 **Educating Language Minorities** (3) Staff
A study of federal, state, and local policies and issues affecting the education of linguistically diverse populations. Resources for use with specific linguistically diverse groups. (Spring)

251 **Linguistic Applications in English as a Second Language** (3) Staff
A study of the science of language (phonology, morphology, syntax, semantics) and how its different branches (descriptive, social, applied, etc.) may be used for ESL teacher training, classroom instruction, material development, evaluation, research, and policy development. (Fall)

252 **The English Sound System in English as a Second Language** (3) Staff
A description of the phonological composition and variation of English as applied to instructional practices specifically oriented toward linguistically diverse groups. (Fall)

253 **The Structure of English in ESL Practice** (3) Staff
A review of the morphological and syntactic characteristics of English, as related to instructional practices specifically oriented toward linguistically diverse groups. (Spring)

254 **Issues, Studies, and Practices in English as a Second Language** (3) Staff
A critical review of scholarship and research findings in English as a second language. Major policy issues and implications that relate to ESL practice. (Summer)

259 **The Principalship, K–12** (3) Power
A general introduction to the principalship. Stresses leadership roles and management tasks in instruction, curriculum, budget, staff development, supervision, interagency services, student learning, and legal considerations. Site-based management and communication within a changing and diverse school environment. (Fall)

260 **Supervision in the Elementary and Secondary School** (3) Power
For experienced teachers and administrators. Review of modern supervisory concepts, including practices in schools. Prerequisite: Educ 248. (Spring)

261 **Practicum in Human Development** (3) Staff
Open to human development majors with permission of instructor.

262 **Internship in Human Development** (3) Staff
Open to human development majors with permission of instructor.

267 **Practicum in College Student Development** (3 to 6)
Supervised practical experience in college student development programs. Admission by permission of instructor. (Fall and spring) Bosw

268 **Power, Leadership, and Education** (3) Boswell
The nature of power, leadership, and education; the relationship of power to leadership; the essential nature of education in the exercise of power and leadership in a democratic setting.

271 **Education Policy** (3) Boswell, Jackson, Wo
An introduction to the policy cycle, policy actors, and how major federal education policies play out at the state and local level

272 **Educational Planning** (3) Staff
An examination of the planning movement in education: its historical development and the recent shift in premises, context, and expectations. Different approaches to the planning process; its relationship to the concepts of systems and futurism; participatory, sectorial, and regional aspects; role of research; and overview of main analytical techniques currently in use.

273 **Foundations of College Student Development** (3) Staff
College student development theories, practices, and problems, including historical overview and human development theories related to college students. (Fall)

275 **School Finance** (3) McDonald, Pow
The financing of public elementary and secondary education in the United States: current revenue sources, distribution decisions, and trends in the operations of schools. Litigation, finance policies, and equitable investments of public monies. (Spring) McDo

276 **School–Community Relations** (3)
The purpose, scope, essential elements, and impact of a successful school-community relations program. Community power structures, the roles of professional leadership, communication techniques for interacting with various audiences and the media, evaluation of public relations and marketing for educational institutions. (Fall) Boswell

277 **Dynamics of Change** (3)
An analysis of the process of change, particularly as it relates to education policy. Comparison of theories; analytical tools, historical precedents, examples of federal education policies Powell

278 **School Law** (3)
The legal basis of education and public schools in the United States. Constitutional provisions and federal statutes that guide school law. Conscious of practical school situations for legal implications; development of skills to research legal issues in schools, and preventive law measures. (Spring) McDonald, Powell

279 **Practicum in Supervision** (3 to 6)
Practical experience in supervision of instruction. Admission by permission of instructor (Fall and spring)

280 **Internship in Supervision and Instructional Leadership** (3 to 6) McDonald, Powell
Service in a school situation directed by the University's faculty and school systems; integration of theory and practice.

281 **Program Evaluation: Theory and Practice** (3) Staff
A general introduction to the theory of evaluation of social programs. Overview of evaluation models, methodology associated with program evaluation, and examination of evaluation in the context of political and social environments.

282 **Administration of College Student Development Services and Programs** (3) Staff
An overview of student affairs administrative practices, including needs assessment, planning models, budgeting, policy development, program development, facility management, evaluation, and team building. Admission by permission of instructor. (Fall)

283 **Higher Education in the United States** (3) Greenberg and Staff
History, philosophy, scope, purpose, present status, programs, and trends in higher education in the United States. (Fall and spring)

284 **Administration of Higher Education** (3) Ferrante, Fife
Government, organization, and administration of colleges and universities, duties of trustees and administrators. (Fall and spring)

285 **Education and National Development** (3) Boswell
Examination of the basic assumption that education contributes to national development. In addition to economic growth and civic identity, what constitutes national development in advanced industrial societies and societies moving to industrialism? What role does education play in promoting this process?

286 **Interpretation in the Historic House Museum** (3) Stapp
Same as AmSt 286. Seminar integrating advanced practices of museum education with current scholarship in architectural history, material culture, social history, and women's studies. Extensive use of Washington museum resources. Open to undergraduate and graduate students. (Fall)

292 **Practicum in Educational Policy Program Evaluation** (3 to 6) Rist
Supervised practical experience in field placements. Admission by permission of instructor. (Fall, spring, and summer)

293–94 **Research and Independent Study** (1 to 3) Staff
Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)

295 **Quantitative Methods II: Research Design and Data Analysis** (3) Paratore, Holmes, Mueller
Required of all GSEHD master's students. Second-level course in social science research methods. Emphasis on research design and inferential data analysis (*t* test, ANOVA, simple regression). Prerequisite: Educ 212 or equivalent. (Fall, spring, and summer)

298–300 **Thesis Research** (3–3) Staff

301 **Advanced Study: Ideas, Issues, and Practices in Education** (3) Boswell, Jackson, and Staff
For precandidates for the Ed.D. Alternative means of responding to the complexities of the educational process. Topics vary but concern education as an individual process and as sociocultural preservation and renewal. May be repeated for credit.

302 **Quantitative Methods III: Basic Inferential Data Analysis** (3) Holmes, Paratore, Mueller
Required of all GSEHD doctoral students. Topics include one- and two-way ANOVA, correlation, simple linear regression, and selected nonparametric techniques. Prerequisite: Educ 295 or equivalent. (Fall and spring)

303 **Advanced Quantitative Data Analysis** (3 to 6) Mueller
Multivariate analysis methods such as factor analysis and structural equation modeling. Analyses performed with commonly used statistical software packages. (Fall and spring)

306 **Quantitative Methods IV: Research Design and Analysis** (3) Holmes, Paratore, Mueller
Required of all GSHED doctoral students. In-depth exploration of sampling strategies, research design selection, instrumentation, and data collection and analysis procedures. Prerequisite: Educ 302 or equivalent. (Fall and spring)

307 **Qualitative Research Methods** (3) Rist
A general introduction to qualitative research procedures in social science research. Application of qualitative methods, design, analysis.

308 **Practicum in Qualitative Research Methods** (3) Rist
The development of data collection and analysis skills through the conduct of field-based qualitative research. Prerequisite: Educ 307.

320 **The Politics of Education** (3) Boswell, Woland
Examination of the role of political interest groups and ideology in shaping educational policy.

321 **Education, Government, and the Economy** (3) Jackson
Examination of the interpretations and interdependencies of education and economic policies as they are played out at various levels of government

329 **Seminar in Program Evaluation** (3) Ris
Contemporary problems and issues in evaluation of social programs: design implementation, analysis, and utilization. (Spring)

331 **Personnel Administration** (3) McDonald, Powell
Human resource management: planning, recruitment, selection, placement and induction, staff development, rewards, and negotiations. Issues and legislation that influence personnel functions and policy; communication skills for human resource leadership. (Fall)

334 **Doctoral Internship in Educational Policy** (3 to 6) Futrell, Ris
Supervised internship in education or human services settings for advanced doctoral students. (Fall, spring, and summer)

340 **Methods of Policy Analysis in Education** (3) Futrell, Rotberg
Modes of analysis employed in the study of educational policy issues. Alternative methods of analysis for policy formation, implementation, and impact assessment. Both theoretical and case study materials are used. Prerequisite: Educ 295. (Fall and spring)

342 **Language Development** (3) Staff
Nature of first and second language acquisition and development; emphasis on sociolinguistics and psycholinguistics most pertinent to educational settings. (Fall)

344 **Adult Development and Aging** (3) Staff
Theories and research on personality and cognition in adulthood and old age. Emphasis on evaluating research designs and methods and deriving implications of findings for gerontological programs and selected professional roles. (Spring)

345 **Advanced Studies in Educational Policy Analysis** (arr.) Rotberg

353 **Seminar: Higher Education Administration** (arr.) Greenberg, Ferrante, Tibb

354 **Seminar: Administration and Supervision** (arr.) McDonald, Powell

355 **Seminar: Applied Educational Administration** (3 to 6) McDonald, Powell
Application of the theories and principles of administration to public and private schools. Field experience in a phase of administration and supervision. Admission by permission of instructor Staff

356 **Seminar: Human Development** (arr.) Powell

369 **School Business Management** (3)
Management and control of the business functions of school districts. Accounting, planning, developing, and presenting educational budgets, the legal contexts affecting school business management. Risk management and school budgeting. (Fall) Staff

372 **Internship in Higher Education** (3 to 6)
Supervised experiences in selected areas in college/university administration and teaching. Admission by permission of instructor (Spring) Greenberg

373 **The Community/Junior College** (3)
The two-year college as it relates to secondary education, four-year colleges and universities. Objectives, curricula, students, faculty, legal concerns and problems of two-year colleges. (Fall and spring) Ferrante, Confess

374 **Current Issues in Higher Education** (3) Tibb
Prerequisite: Educ 283, 284. (Spring)

378 **Financing Higher Education** (3)
Analysis of private, state, and federal revenue sources; student aid, programs, budgets, and financial methods and practices. (Spring)

379 **Administration and Governance of Two-Year Colleges** (3) Greenberg
A study of the community junior college, focusing on administrative and governance patterns and national, regional, state, and local influences, as well as the theory and structure of two-year college organization (Fall and spring)

380 **Legal Problems in Higher Education** (3) Fife
Investigation of legal problems in higher education related to the legal structure of higher education, religious concerns, students, faculty, and academic programs. (Spring)

381 **College and University Curriculum** (3) Fife, Greenberg, Confessore
Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum. (Fall)

382 **Teaching Strategies for Adult Learners** (3) Greenberg, Confessore
Designing, implementing, and evaluating instructional strategies for adult learners. Assessing needs, writing objectives, selecting curriculum content, selecting and implementing methods and techniques, selecting appropriate mediating devices, and evaluating instruction. (Spring)

384 **College and University Governance** (3) Ferrante, Confessore
Organizational and administrative structures, patterns, and relationships in higher education. Prerequisite: Educ 284 (Fall)

385 **Problems and Practices in Educational Administrative Organization** (3 to 6) Fife, Confessore
Application of principles and practices concerned with change and evaluation of educational administration.

386 **Internship: Higher Education Administration** (3 to 6) Greenberg
Service in a higher education situation directed by the University and the cooperating institution to integrate theory and practice. (Fall and spring)

387 **Internship: Administration** (3 to 6) McDonald, Powell
Service in an educational institution or education-related program directed by the University's faculty.

388 **Case Studies in Higher Education Administration** (3) Ferrante, Confessore
An analysis of case studies related to administrative functions in colleges and universities.

390 **Pre-Dissertation Seminar** (3 to 6)
Required of all departmental Ed.D. degree candidates. Approval of the dissertation research proposal by the dissertation committee is necessary for successful completion of the seminar. Admission by permission of instructor.

391 **Dissertation Research** (arr.)
Prerequisite: Educ 390

ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Professors W.K. Kahn, R.L. Pickholtz, A.C. Meltzer, W.D. Maurer, H.I. Helgset, R.H. Lang, N. Kyriakopoulos, T.N. Lee, E. Della Torre, R.J. Harrington, L.J. Hoffman, W. Wasylkiwskyj, A.A. Anavendrudis, S.Y. Berkovich, M.B. Feldman, M.H. Loew, R.L. Carroll, Jr., M.E. Zaghloul, *Chairs*; M. Pardavi-Horvath, B.I. Edelson (*Research*), P.S. Bock, J.I. Sibert, R.S. Heller, S. Bennett (*Research*)

Adjunct Professors P.J. Crepeau, G.J. Kowalski, D.C. Roberts, A. Schneider, W.D. Jackson, J.R. Stevenson, G.R. Heidbreder, O.S. Mazzoni, R.K. Lay

Professorial Lecturers A.A. Wolf, L.M. Leibowitz, P.M. Kelly, M. Mohajeri, J.H. Scharenguivel, I. Donelson III, J.W. Benoit, A.F. Mantredi, Jr., A.K. Mehzetra, R.M. Fano, D.L. Nicholson, W.L. Pritchard, J.M. Schumpert, D.R. Smith, D.M. Le Vine, J.B. Williamson, F.M. Zoskind, C. Alexander, Jr.

Associate Professors S. Rotenstreich, C.D. Martin, D. Saha, H.-A. Chou, K.B. Eom, E. Sarajan, A. Youssef, J.K. Hahn, B.R. Vojcic, C.E. Korman

Associate Professorial Lecturers E.H. Neal, C.E. Knadler, Jr., E.A. Walker, J.F. Kuenzi, T.B. Fowler, M.C. Frame, P.E. Gardner, S.H. Kalisker, J.J. Knab

Assistant Professors M. Doroslovacki, Z. Guo, S. Subramanian

Assistant Professorial Lecturers J.W. Sargent, J.W. Lee, J.S. Mathuru, H.V. Tran, J. Thi, R.A. Fernandez, L. Lau, F.M. Nelson

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

Note: Doctoral students must select a minimum of three "higher level" courses prescribed by their advisor as part of the program of study. See the department's Graduate Student Handbook.

ELECTRICAL ENGINEERING

202 **Linear Systems Theory (3)** Kyriakopoulos and Staff
Introduction to linear systems theory. Topics include linear vector spaces and linear operators, mathematical representation of dynamic linear systems, concept of state and solution of the state equation, controllability and observability, canonical forms of the state equation, state feedback, and state estimation. (Fall and spring)

203 **Stochastic Processes in Engineering** (3) Pickholtz and Staff
Basic concepts of probability and random variables: characterization and functions, limit theorems. Random processes: characterization, stationarity, power spectrum, and linear filtering. Optimum linear systems: orthogonality principle. Discrete and continuous Markov chains. Elements of queuing theory. Prerequisite: EE 12, ApSc 115, or equivalent. (Fall and spring)

207 **Electromagnetic Theory** (3) Lang and Staff
Maxwell's equations, moving media, vector wave equations. Poynting vector theorem, time-harmonic solutions. Plane waves in isotropic and anisotropic media, polarization, phase and group velocity. Reflection and refraction of plane waves at interfaces. Radiation, dyadic Green's functions and aperture diffraction. Prerequisite or concurrent registration: EE 211. (Spring)

208 **Digital Image Processing** (3) Liew and Staff
Properties of images and visual systems. Image acquisition, sampling, quantization. One- and two-dimensional image transform techniques, enhancement and restoration. Image coding and data compression. Segmentation, representation, boundary and shape, texture, matching. Image understanding. Computer applications and projects. Prerequisite: EE 202. (Spring, odd years)

209 **Data Compression** (3) Youssef and Staff
Background on signals, information theory, transforms, human vision, and metrics. Lossless and lossy compression techniques. Video compression. Compression standards. Progressive transmission. Prerequisite: permission of instructor. (Fall)

210 **Applied Electromagnetics** (3) Lang and Staff
Review of Maxwell equations, electromagnetics of circuits, plane wave propagation, transmission lines; waveguides; radiating systems, receiving antennas and pattern reciprocity, array antennas; electromagnetic properties of materials, conductors, crystals, devices; optical transmission. Prerequisite: EE 207, ApSc 114. (Fall and spring)

211 **Signals and Transforms in Engineering** (3) Wasylkiwskyj and Staff
Representation of discrete and analog signals as sums of canonical elementary functions; normal equations and the LMS approximation theory; sampling theorem; decomposition for discrete and continuous signals; application of linear transform theory; application of wavelets to data compression and multiresolution analysis. Prerequisite: EE 12; ApSc 114. (Fall and spring)

212 **Network Analysis** (3) Zaghloul and Staff
Network theorems, functions, and properties. Introduction to the theory of linear networks, nonlinear resistive network equation formulation by tableau and other nonlinear equations. Nonlinear dynamic network equations: formulation, state space, conditions for existence. Concepts of stability in nonlinear systems: conservative and Lagrangian networks and systems. (Fall, odd years)

213 **Design of VLSI Circuits** (3) Zaghloul and Staff
Design techniques for large-scale digital systems, design environment, algorithms, architectures issues, use of VHDL for system design and simulation, mask level simulation, switch level simulation, synthetic tools, timing verification. Design and simulation using commercial VLSIC CAD tools. Prerequisite: EE 126 or permission of instructor. (Fall, even years)

214 **VLSI Design** (3) Zaghloul and Staff
Advanced design and analysis techniques for VLSI circuits. Design methodology of VLSI circuits, noise consideration, semi-custom design gateways. Design techniques for data path and data control design. Simulation techniques. Studies of state

VLSI system using CAD computer and simulate design. Prerequisite: EE 126 or permission of instructor. (Fall, odd years)

215 **Linear Network Synthesis I** (3) Lee and Staff
Properties and testing of positive real functions. Synthesis of LC, RL, and RC one-port networks. Brune, Bott–Duffin, Miyata, Kuh, and Darlington synthesis techniques. Introduction to two-port ladder and lattice synthesis. Three-terminal RC network synthesis approximation in the frequency and time domains. Prerequisite: EE 202 or permission of course director. (Fall, even years)

216 **Active and Distributed Networks** (3) Lee and Staff
Active network synthesis using negative resistors, control sources, NIC, operator, and operational amplifiers. Uniform and nonuniform distributed network analysis and synthesis—computer-aided design. Prerequisite: EE 215. (Spring, odd years)

217 **Neural Networks (3)** Zaghloul and Staff
Theory of neural network models, relation to biological models. Examples of known models. Possible applications of neural networks. Neural network VLSI implementations, digital vs. analog approaches. Building blocks. Examples on realized neural networks. (Spring)

218 **Analog VLSI Circuit Design** (3) Zaghloul and Staff
MOS technology: building blocks, devices, capacitors, limitations. Operational amplifiers and other analog systems. Layout examples and design principles. Students use the CAD VLSI laboratory to design and simulate circuits. Prerequisite: EE 126 or equivalent. (Spring)

219 **Computational Techniques in Electrical Engineering** (3) Lang and Staff
Introduction to linear algebra and vector spaces as applied to networks and electrical systems. Orthogonal bases, projections, and least squares. Fast Fourier transforms. Eigenvalues and eigenvectors with applications. Computations with matrices. Constrained optimization in electrical systems. Network models and applications. Prerequisite: EE 12, ApSc 114.

221 **Physical Electronics I (3)** Pardavi-Horvath and Staff
Theoretical principles underlying the operation of electronic devices. Foundations of quantum mechanics. Lagrangian and Hamiltonian. Postulates of quantum mechanics. Particle-wave duality. Uncertainty relationships. Quantum theory of electronics. "Particle in a box"—electron in a potential. (Fall)

222 **Physical Electronics II** (3) Pardavi-Horvath and Staff
The Boltzmann transport equation. Particle statistics (Maxwell–Boltzmann, Bose–Einstein, Fermi–Dirac distribution). Electrons in a crystal: band theory of semiconductors. Band-structure engineering: physical principles of optoelectronic and semiconducting devices, lasers. Prerequisite: EE 221. (Spring, odd years)

223 **Optical Communications Systems** (3) Kahn and Staff
Optical communications channels, survey of laser sources, modulation, line-of-sight links, system models and analysis, detection, noise mechanisms, and signal-to-noise analysis, optical-fiber waveguides, repeaters, and systems analysis, integrated optical components. Prerequisite: EE 207, 244. (Spring, odd years)

224 **Electronics of Lasers** (3) Kahn and Staff
Basic concepts from quantum mechanics, Einstein coefficients, inversion and pumping mechanisms, rate equations. Resonators. He–Ne laser, organic dye lasers, injection lasers. Nonlinear interactions in lasers. Prerequisite: EE 222 or equivalent. (Fall, every third year)

225 **Device Electronics** (3) Korman and Staff
Semiconductor device concepts, impurity doping, drift diffusion, recombination. Analysis of Schottky and Ohmic contacts, *pn* junctions, MOS systems. Modeling and analysis of semiconductor devices such as MOSFET, JFET, and bipolar transistors. Numerical modeling of semiconductor devices to CAD of VLSI circuits. Prerequisite: EE 121 or equivalent. (Fall, even years)

226 **Fiber and Integrated Optics** (3) Kahn and Staff
Propagation in stepped-index and gradient-index optical fibers: scattering and attenuation, phase velocity, group velocity, impulse response, energy transport, ray tracing, Goos–Haenchen shift, Hamiltonian formalism. Directional couplers, modulators, and deflectors in fibers and surface films. Coupled-mode theory. Prerequisite: EE 210. (Spring, even years)

232 **Applied Magnetism** (3) Perdavi-Horvath and Staff
Classification of magnetic materials. Magnetic measurements. Soft and hard magnetic materials. Applications to microwave, magnetic recording, permanent magnets, magneto-optics, magnetostrictive devices. Magnetic sensors. Electric power. Superconducting devices. Prerequisite: EE 210. (Spring, even years)

233 **Microwaves and Components** (3) Kahn and Staff
High-frequency transmission lines and guided systems, matching techniques, scattering parameters, transfer parameters, directional couplers, cavity resonators, Faraday rotation, ferrite isolators and circulators. Prerequisite: EE 210. (Fall)

234 **Wave Propagation** (3) Wasylkiwskyj and Staff
Electromagnetic and acoustic propagation in inhomogeneous media. WKB approximation, geometrical optics, layered media. Stationary phase and steepest descent evaluation of integrals, application to field computation at caustics. Prerequisite: EE 207. (Spring, even years)

235 **Antennas** (3) Kahn and Staff
General solution of Maxwell's equations in terms of current sources, polarization, far-field approximations, radiation from current distributions, field equivalence theorems, geometrical optics approximation, aperture antennas, receiving antennas, theory of arrays, and applications to specific antennas and antenna types. Prerequisite: EE 210. (Spring, odd years)

236 **Electromagnetic Radiation and Scattering** (3) Wasylkiwskyj and Staff
Electromagnetic scattering by simple shapes, asymptotic high-frequency approximations, creeping waves, geometrical theory of diffraction. Approximation techniques in radiation and scattering. Rayleigh and Born approximations. Prerequisite: EE 207, 211. (Fall, odd years)

237 **Waves in Random Media** (3) Lang and Staff
Propagation and scattering of electromagnetic, optical, and acoustic waves in random media, scattering from rough surfaces and randomly distributed particles, turbulence. Applications to propagation through rain and fog. Laser beam scintillations, remote sensing, and communications channel modeling. Monte Carlo simulation. Prerequisite: EE 203. (Fall, even years)

238 **Remote Sensing** (3) Lang and Staff
Active and passive remote-sensing systems: scatterometers, real-aperture imaging, and synthetic aperture radars. Sensing of surface, subsurface, and atmospheric parameters at microwave, infrared, and optical frequencies. Analytical radiometric techniques using radiative transport theory, inverse scattering methods, profile inversion. Prerequisite: EE 210. (Spring, odd years)

239 **Numerical Electromagnetics** (3) Wasylkiwskyj and Staff
Numerical methods for the solution of electromagnetic scattering and radiation problems. Major techniques: method of moments, T-matrix and finite element methods, geometrical theory of diffraction and hybrid approaches. Application of the method of moments to scattering and radiation by wire structures, surfaces, and composite bodies. Prerequisite: EE 207. (Spring, even years)

241 **Information Theory** (3) Sahai and Staff
The concepts of source and channel. Measure of information, entropy, mutual information. The noiseless coding theorem. The noisy coding theorem. Channel capacity: symmetric and nonsymmetric channels. Gaussian and nonGaussian channels. Rate-distortion theory. Basics of multiple-user information theory. Prerequisite: EE 203. (Fall)

242 **Coding Theory** (3) Sahai and Staff
Linear codes: parity and generator matrices, syndrome error correction and detection capability, minimum distance. Performance bounds of linear codes. Hamming and Golay codes. Galois fields, shift register implementation of cyclic codes. BCH codes: the BCH decoding algorithm, burst-correction codes. Prerequisite: EE 203. (Spring)

243 **Communication Theory I** (3) Pickholtz and Staff
Optimum receivers for vector channels and for the additive white Gaussian noise channel, fading channels, diversity, correlation detectors, matched filters, coherent and noncoherent detection; bounds on the performance of digital communications, comparison of communications systems. Prerequisite: EE 203 or equivalent. (Fall and spring)

244 **Communication Theory II** (3) Pickholtz and Staff
Schemes for efficient signaling for data sequences: effects of quantizing at the receiver. Practical implementation of orthogonal and simplex coded communication. Convolutional codes. Trellis codes: bounds on performance decoding by sequential (Zigangirov–Jelinek, Fano) and MAP (Viterbi) algorithms. Topics from digital communications. Prerequisite: EE 243. (Spring)

245 **Signal Detection and Estimation** (3) Wasylkiwskyj and Staff
Bayesian, minimax, and Neyman–Pearson hypothesis testing, signal detection in discrete and continuous time, nonparametric and robust detection; theory of parameter estimation, Cramer–Rao bounds, recursive parameter estimation; signal estimation, Kalman-Bucy and Wiener-Kolmogorov filtering. Prerequisite: EE 203. (Fall)

246 **Digital Communications** (3) Vojcic and Staff
Analysis and design of digital communications systems for voice, video, and data. Digital coding of waveforms; Nyquist criteria; intersymbol interference (ISI). Partial response signaling. Practical considerations in design of signals for modems and recording media. Digital switching and integrated services digital networks. Prerequisite: EE 244. (Fall)

247 **Communications Systems** (3) Vojcic and Staff
Digital communications systems. Generation of carrier phase references using phase-locked loops (PLL). Optimum design of PLL. Maximum likelihood estimation of carrier phase and symbol timing. Performance degradation. Applications to PCM, TDMA, and spread-spectrum systems. Prerequisite: EE 244 or equivalent. (Spring)

248 **Computer Networks I** (3) Helgert and Staff
Local and wide area switched networks. Topologies, architectures, the OSI Reference Model. Data transmission techniques, synchronous and asynchronous communications, baseband signaling modems, FDIX and TDM. Error-control, data link control, flow control, bisync and HDLC procedures. Network protocols. Prerequisite: EE 144 or equivalent. (Fall and spring)

249 **Computer Networks II** (3) Helgert and Staff
Design and analysis of computer communication networks. Circuit and packet switching. Traffic theory for data. Queuing models. Buffer design and statistical multiplexing. Delay and cost minimization; topological design algorithms. Network routing and flow control. Analysis of multiple-access algorithms. Prerequisite: EE 203, 248. (Spring)

250 **Telecommunications Security** (3) Hoffman and Staff
Cryptography. Speech and data scrambling. Nonlinear transformations. Block and stream ciphers. DES algorithm and public key cryptography. Key management, digital signatures, and authentication. Data communication security protocols. Secure voice communications. Companion course to CSci 229. Prerequisite: EE 203. (Spring, odd years)

251 **Switched Telecommunication Networks** (3) Helgert and Staff
Switching technology and traffic models for circuit, packet, and integrated networks. CCIS and SS7. Analytical bounds on the complexity of switched networks. Digital time-division and store-and-forward switches. Mobile switching office and cellular networks. PEABX and distributed switching. Prerequisite: permission of course director. (Spring, even years)

252 **Digital Signal Processing Techniques** (4) Kyriakopoulos and Staff
Signal and system representation, sampling and quantization, transform techniques. Recursive and nonrecursive digital filter design, recursive estimation, linear predictive filtering. Fast algorithms for signal processing. Current topics. Prerequisite: EE 117 or 211, and 203. (Fall)

253 **Mobile Communications Systems** (3) Vojcic
Structure and evolution of mobile communication networks. Analog, conventional digital, and broad band (spread-spectrum based) digital mobile networks. Switching, transmission, signalling, and interfacing to the public switched telephone networks. Evolving technologies and standards in mobile communications. Prerequisite: EE 244. (Spring, even years)

258 **Radar Systems** (3) Lang and Staff
The radar range equation. Radar cross section of targets, target detection and parameter estimation, detection in clutter. Resolution, ambiguities, and signal

design. Moving-target indicators. Pulse-Doppler radar. Radar antennas, phased arrays. Synthetic aperture and space-based radar. Prerequisite: EE 203, 210 (Spring)

255 **Optical Processing** (3) Kahn and Staff
Fourier transforms by diffraction of light, optical spectrum analysis, optical memories and systems, holography and holographic techniques, properties and techniques for photographic reproduction. Prerequisite: EE 211. (Fall, even years)

257 **Spread-Spectrum Communications** (3) Vojcic and Staff
Direct sequence encoding, frequency and time hopping, and hybrid techniques. NP sequence generation. Conventional code division multiple access. Multiuser detection and capacity limits for multiuser communications. Spread-spectrum and other signal processing techniques. Applications to mobile communications. Prerequisite: EE 243. (Fall, even years)

258 **Radio Communications Systems I** (3) Lang and Staff
Analysis and design of microwave communications systems. Free-space propagation, knife-edge diffraction, atmospheric refraction and troposcatter. Time-variant channel characterization. Diversity reception. Spectral characteristics of radio signals. Design of line-of-sight, troposcatter, and cellular mobile systems. Prerequisite: EE 210, 243. (Fall, even years)

259 **Radio Communications Systems II** (3) Lang and Staff
Analysis and design of ionospheric communication systems. Morphology of the ionosphere and propagation of ionospherically reflected radio waves. RAKE receiver and adaptive channel equalization. Wideband HF, atmospheric noise and non-Gaussian channel performance. Design of VLF, LF, HF, and meteor-burst systems. Prerequisite: EE 258 or permission of instructor. (Spring, odd years)

260 **Applied Superconductivity** (3) Harrington and Staff
Thermodynamic and quantum properties of superconductors. High-temperature superconducting materials. Electrical and magnetic characteristics. Material preparation. Wire construction. The theory of superconducting magnets, transformers, machines and applications to computers. Prerequisite: permission of course director. (Fall, even years)

261 **Electromechanical Energy Conversion** (3) Harrington and Staff
Characteristics of synchronous machines, synchronous reactance, reactance theories, synchronizing generators and parallel operation of machines, characteristics of asynchronous machines, machines as circuit elements. Steady-state and dynamic performance of alternating current machines. Prerequisite: EE [illegible] and permission of course director. (Fall, even years)

262 **Power Electronics** (3) Harrington and Staff
Types of power converters and switching matrices. Existence functions and their representation. Control variables. Review of power semiconductor switching devices. Analysis of DC-DC, AC-DC, and AC-AC converters. Circuit interfacing, commutation and control. Prerequisite: EE 178 and permission of course director. (Fall, odd years)

263 **Applications of Power Electronics** (3) Harrington and Staff
Analyses and design of DC and AC variable speed motor drives. Converter topology and switching devices. Detailed performance analysis. Computer modeling of converters. Methods of converter control. Power system applications, generation, transmission, and storage. Prerequisite: EE 262 or permission of course director. (Spring, even years)

264 **Direct Electrical Energy Conversion** (3) Harrington and Staff
Direct generation and storage of electricity based on charged carrier transport in solid, liquids, and gases. Thermodynamic limitations and the Carnot [illegible]. Band theory and electrical conduction in semiconductors. Photovoltaic [illegible] and thermoelectric potentials. Conduction in gases. Electromagnetic [illegible] thermionic converters. Prerequisite: Permission of course director. (Spring, odd years)

265 **Transients in Electrical Power Lines** (3) Harrington and Staff
Switching and lightning surges and the resultant overvoltages on long lines. Breaker closing sequence effects and effect of source side inductance and multiple infeeds. Recovery voltage after short line faults. Methods and theory of protection. Calculation of overvoltages and insulation level requirements. Prerequisite: Permission of course director. (Spring, even years)

266 **Power System Control and Stability** (3) Harrington and Staff
EHV AC power transmission, load flow, automatic generation control, economic dispatch, voltage instability, steady state stability, dynamic stability, machine modelling, exciter and governing systems, frequency and voltage control, contingency analysis. Prerequisite: EE 178 or permission of course director. (Fall, even years)

267 **Power System Operation and Planning** (3) Harrington and Staff
Real time load flow, security assessment, advanced contingency analysis, islanding and system state classification, system restoration, power system reliability, generation and transmission planning, load forecasting, unit commitment, planning with economic and reliability constraints. Prerequisite: EE 266 or permission of course director. (Spring, odd years)

268 **Electrical Power Distribution** (3) Harrington and Staff
Transformer and insulation design at distribution voltage levels. Medium- and low-voltage switchgear requirements. Protective relaying, harmonic filtering, power-factor correction, grounding systems. Prerequisite: EE 178 and permission of course director. (Spring, odd years)

269 **Engineering Resources and Environmental Issues in Electrical Power** (3) Harrington and Staff
Introduction to engineering issues involved in selecting electrical power systems. Primary resources. Worldwide distribution. Relation to the developing alternate technology base for power. Environmental, social, economic, and educational considerations. Impact of changing regulations. Prerequisite: Permission of course director. (Fall, odd years)

270 **Protection for Power Systems** (3) Harrington
Typical protective relay systems. Directional sensing of faults. Backup and line protection of generators, transformers, reactors, shunt capacitors, bus, motor, and long EHV series-compensated lines. Stability, reclosing, and load shedding. Systems swings, grounding, and transient overvoltage protection. Prerequisite: EE 178 and Permission of course director. (Fall, odd years)

271 **Linear Multivariable Controls** (3) Carroll and Staff
Control of systems having multiple inputs or outputs. Frequency-domain techniques in linear quadratic Gaussian, loop transfer recovery, H_∞, and Nyquist array design. Prerequisite: EE 172, 202, 273. (Fall, even years)

272 **Computer Control Systems** (3) Carroll and Staff
Analysis of automatic control systems in which the control procedure uses on-line digital computation. Topics include single- and multirate sampling, z-transforms, responses of discrete systems, stability criteria, and discrete control design. Prerequisite or concurrent registration: EE 202. (Spring)

273 **System Optimization** (3) Carroll and Staff
Parameter optimization problems, theory of minima and maxima. Optimization problems for dynamic systems, calculus of variations, the maximum principle and the Hamilton–Jacobi equation. Optimization problems with constraints, optimal feedback systems. Numerical solution of optimal problems. Prerequisite: EE 202 or equivalent. (Spring)

274 **Nonlinear Systems** (3) Carroll and Staff
Definition of linear and nonlinear systems. Introduction to approximate analysis of nonlinear systems—describing functions, Krylov and Bogoliubov asymptotical method, and Tsypkin locus. Forced oscillations—jump resonance. Stability analysis—Liapunov criterion. Lurê problem and Popov method. Prerequisite: EE 202. (Spring, odd years)

275 **Identification and Adaptive Control** (3) Carroll and Staff
Identification is the process of mathematically modeling a system based on measurement data that may be limited or uncertain. Adaptive control is the means whereby a system that is poorly modeled is adequately controlled. Various approaches to each of these problems are discussed. Prerequisite: EE 202, 203. (Spring, even years)

276 **Design of Robotic Systems** (3) Carroll and Staff
Topics related to robotics: coordinate transformations, kinematics, dynamics of robot manipulator arms, trajectory planning, sensors, internal transmissions, actuators, robot control systems design, vision systems, and programming languages. Prerequisite: ApSc 58, CSci 100. (Fall)

277 **Satellite Systems** (3) Pickholtz and Staff
Theory and applications of satellite communications. Modulation and multiple access techniques. Link design. Satellite transponders and antenna systems. Ground stations. VSAT networks. Random-access techniques and satellite packet communications. Low Earth Orbit Satellite (LEOS) system. Prerequisite: EE 244. (Fall, odd years)

278 **Spacecraft Systems Design** (3) Pickholtz and Staff
Space environment, structure, propulsion, control, and instrumentation of spacecraft—launch, orbit, transit, and reentry problems, bioastronautic considerations. Prerequisite: graduate status. (Spring, even years)

279 **Stochastic Control Systems** (3) Lee and Staff
Introduction to random process in control systems. Properties of Markov process, systems of covariance equivalence and of deterministic and stochastic control equivalence; dynamic programming for Markov process—principle of optimality, linear systems with quadratic cost, Kalman filtering, smoothing, and predicting. Prerequisite: EE 203, 273. (Fall, odd years)

280 **Anatomy and Physiology for Engineers** (3) Guo and Staff
Human anatomy and physiology from an engineering viewpoint. Analyses of functions of major physiological systems. Biopotentials, mechanics, gas exchange, chemical balance, electrical and chemical signaling, nervous control, voluntary and reflex factors. (Fall)

282 **Medical Measurements** (3) Loew and Staff
Theory of measurements in biological areas, techniques for electronic measurements on biological specimens. Experiments in acquisition, processing, and measurement of physiological signals, ECG, EEG, and EMG. Prerequisite: EE 280 or permission of course director. (Fall)

283 **Medical Instrumentation Design** (3) Guo and Staff
Modern biomedical measurement techniques and instrumentation, including theory of data acquisition, biopotentials, biomedical signal processing, clinical laboratory instrumentation, respiratory system measurements, medical imaging, and prosthetic devices. Prerequisite: EE 282. (Spring)

284 **Biomedical Signal Analysis** (3) Loew and Staff
Origin, acquisition, and analysis of physiological signals. Deterministic and probabilistic modeling, fitting models, sequences and time series. Feature extraction from EEG and ECG. Fourier analysis and filtering. Hypothesis testing and design of experiments; sequential and nonparametric pattern recognition. Prerequisite: EE 282, corequisite: EE 283. (Spring)

285 **Evoked Potentials I** (3) Loew and Staff
Physiological significance of the sensory-evoked potentials, stimulation variables, subject variables, data acquisition procedures and instrumentation, signal-averaging computers, analysis techniques for the VEP, applications of the VEP. Lectures, discussion, and laboratory. Prerequisite: EE 281, 282, 283, or permission of course director. (Spring)

286 **Clinical Medicine for Engineers** (3) Loew and Staff
Overview of clinical medicine with emphasis on those areas most affected by engineering and technology. Prerequisite: EE 281, 282, 283. (Fall, every years)

287 **Rehabilitation Medicine Engineering** (3) Loew and Staff
Cross-sectional view of those areas of medicine most involved with the treatment of handicapped individuals. Application of engineering theory and techniques to the rehabilitation of handicapped individuals. Major problem areas and general solutions, solutions to some specific problems. Prerequisite: EE 280. (Spring, odd years)

290 **Nuclear Generating Stations** (3) Harrington and Staff
Concepts of fusion plants. Analysis and operating philosophy of PWR, BWR, GCR fission plants. Emphasis on specific electrical requirements. Fundamentals of safety and reliability requirements in nuclear plants. Requirements of protective and monitoring systems. Prerequisite: EE 178 and permission of course director. (Spring, even years)

291 **Physics of Magnetism** (3) Pardavi-Horvath and Staff
Physics of magnetism in solids, with emphasis on magnetic phenomena used in devices. Fundamental properties of magnetic materials. The origins of mag-

netism, demagnetizing fields, anisotropy, magnetostriction, domains and coercivity. Prerequisite: EE 210. (Fall, odd years)

292 **Magnetic Hysteresis** (3) Della Torre and Staff
Hysteresis models. Decomposition into irreversible and locally reversible magnetization. Aftereffect and accommodation. Vector models. Magnetostriction and magnetothermal effects. Prerequisite: EE 210. (Spring, odd years)

297 **Special Topics** (1 to 3) Staff
Topics to be announced in the *Schedule of Classes*. (Fall and spring)

298 **Research** (arr.) Staff
Applied research and experimentation projects, as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

317 **VLSI for DSP Systems** (3) Zaghloul and Staff
VLSI design techniques as applied to DSP systems. CAD tools and standard library design techniques; algorithms and architectures for DSP systems in VLSI. Systolic arrays; parallel and pipelined architecture in DSP. Transform and digital filter algorithms. Prerequisite: EE 252. (Spring, odd years)

319 **Controls, Systems, and Signal Processing Research** (arr.) Staff
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

321 **Mathematical Techniques for Electromagnetics** (3) Lang and Staff
Asymptotic methods for Maxwell's equations; geometric optics. WKB approximation for stratified media; uniform expansion near a caustic and shadow boundary. Perturbation techniques for tenuous medium. Rayleigh–Gans approximation, smoothing, and multivariable methods for stochastic problems. Prerequisite: EE 203, 207. (Spring, every third year)

322 **Waveguide Diffraction** (3) Kahn and Staff
Selections from the following: Analytical treatment of waveguide bifurcations and discontinuities by Wiener–Hopf, mode matching, static approximation. Small apertures (obstacles) in waveguides. Variational methods for evaluation of equivalent circuit parameters. Group theoretic methods for symmetrical junctions. Prerequisite: EE 233. (Fall, every third year)

323 **Principles of Microelectronics** (3) Pardavi-Horvath and Staff
Basic principles, techniques, and processes necessary for understanding microelectronics. Semiconductor physics; phase diagrams, crystal growth, epitaxy, vacuum techniques, thin-film deposition, diffusion, oxidation, junction formation, masking, and properties of thin films and materials. Prerequisite: EE 222 or equivalent. (Fall, odd years)

329 **Electrophysics Research** (arr.) Staff
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

335 **High-Resolution Array Antennas** (3) Wasylkiwskyj and Staff
Review of electromagnetic-wave propagation, radiation and reception by array antennas; antenna arrays as multiport receivers. Angle-of-arrival estimation using MUSIC and related techniques. Application to radar multipath problems and angle-of-arrival estimation. Prerequisite: EE 203, 210. (Fall, even years)

346 **Telecommunications Protocols** (3) Helgert and Staff
Layered protocol models for computer communications networks. Open systems interconnection reference model. CCITT and ISO protocol standards in support of OSI. Proprietary communications architectures: TCP/IP, SNA, and DNA. Protocols for local area networks and integrated services digital networks. Prerequisite: EE 248. (Fall)

347 **Telecommunications Software Engineering** (3) Rotenstreich and Staff
Formal description techniques for protocol specification. Graphic and matrix representations of finite-state protocol models. Specification and Description Language (SDL) and CCITT High-Level Language (CHILL). Software implementations of computer communications protocol architectures. Prerequisite: EE 346. (Spring, odd years)

348 **Telecommunications Networks** (3) Helgert and Staff
Wide-area circuit-switched and packet-switched data communications networks. Subscriber access arrangements and subscriber signaling systems. Network management, services, and performance. Local and metropolitan area networks: IEEE

protocol standards. FDDI; narrowband and broadband integrated services digita
networks. Prerequisite: EE 248. (Spring) Staff

349 **Communications Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination
May be repeated for credit. (Fall and spring)

364 **Direct Energy Conversion** (3) Harrington and Staff
Electrostatic and magnetic conversion systems, conversion of heat to elec
ity, thermoelectric systems, conversion of light to electricity, fuel cells and
batteries, magnetohydrodynamic systems, superconductive machines and sy
tems. Prerequisite: EE 264. (Spring, even years)

368 **High-Voltage Test Techniques** (3) Harrington and Staff
Methods and procedures for measurement of high voltage, basic testing tech
niques for alternating voltages, direct voltages, lighting-impulse voltages
switching-impulse voltages, and impulse currents. Determination of the dielec
tric strength of electrical insulation materials at power frequencies. The use of
sphere gaps for the measurement of peak values. (Spring, even years)

372 **Control of Large Systems** (3) Lee and Staff
Systems as multistage decision processes. Analytical concepts of model max
and matrix representations of large systems. Approximation by models of lower
dimension, reduction to simplified models, decentralized systems. Differential
games, computation of saddle points, construction of an equilibrium point. Pre
requisite: EE 273. (Fall, even years)

382 **Physiological Controls and Systems** (3) Guo and Staff
Some applications of control and systems theory in the medical and biological
fields. Application of general control and systems theory as applied to physio
logical systems. Specific applications of control and systems theory to the neural
system, respiratory system, cardiovascular system, and musculoskeletal system.
Prerequisite: EE 172 or equivalent, 203, 219, 283. (Fall, even years)

383 **Bioelectric Phenomena and Bioelectromagnetics** (3) Loew and Staff
Mathematical treatment of bioelectric phenomena: membrane, dynamics, po
tentials, and subthreshold effects; solid-state phenomena; nerve propagation
Electromagnetic interactions with biological systems: energy absorption and
heat production; diagnostic and therapeutic applications of electromagnetic en
ergy. Prerequisite: EE 210, 283. (Fall, odd years)

384 **Medical Imaging** (3) Loew and Staff
Principles of projection radiography, fluoroscopy, tomography, ultrasound, a
nuclear sources (PET, SPECT); biomagnetic imaging. Characterization of s
and object, recorder resolution and noise. Scatter and attenuation. Reconstruc
tion algorithms and implementations for CT and MRI. Recent developments.
Prerequisite: EE 211 or equivalent, 284. (Fall, odd years)

385 **Special Topics in Medical Engineering** (3) Loew and Staff
Exploration of theoretical or technical advances in medical engineering. Topic
to be announced in the *Schedule of Classes*. (Fall and spring) Staff

389 **Medical Engineering Research** (arr.)
Limited to students working on the Doctor of Science dissertation. May be re
peated for credit. (Fall and spring) Lang and Staff

390 **Colloquium** (0)
Lectures by outstanding authorities in electrical engineering and computer sci
ence. Topics to be announced each semester. (Fall and spring) Staff

399 **Dissertation Research** (arr.)
Limited to Doctor of Science candidates. May be repeated for credit.

450 **Principles of Telecommunications** (3) Pickholtz and Staff
Elements of telecommunications system, representation of signals in the fre
quency domain, and bandwidths of voice, data, and video signals. Sampling,
noise, distortion, and channel capacity. Modulation, multiplexing, and
communications. May not be applied toward a graduate degree in the School of
Engineering and Applied Science. (As arranged)

451 **Telecommunications Transmission Systems** (3) Pickholtz and Staff
Introduction to the use of microwave, fiber-optic, and satellite computer
munications systems. Local area networks, packet-switched networks, routing
algorithms, and performance. May not be applied toward a graduate degree in
the School of Engineering and Applied Science. Prerequisite: EE 450 or per
mission of instructor. (As arranged)

452 **Applications of Telecommunications Technology** (3) Pickholtz and Staff
Advanced topics and recent technological developments in telecommunications, including traffic theory, switching systems, error detection and correction, ISDN, cellular radio systems, and security and privacy in communications. May not be applied toward a graduate degree in the School of Engineering and Applied Science. Prerequisite: EE 451 or equivalent. (As arranged)

COMPUTER SCIENCE

206 **Computer Animation** (3) Hahn and Staff
Euler angles and quaternions, articulated figure motion, forward and inverse kinematics, kinematic, physically based, and behavioral motion control, rendering problems (temporal aliasing), sound synthesis and synchronization, recording and editing techniques. Prerequisite: CSci 185 or permission of instructor. **Prerequisite: CSci 185 or permission of instructor.** (Fall)

215 **Advanced Data Structures** (3) Berkovich and Staff
Sparse matrix transpose and multiplication. List insertion and deletion; lists of available space. In order, preorder, and postorder traversal of trees. Topological sorting. Binary search trees, including AVL trees, B-trees, and tries. Dynamic hashing. **Prerequisite: CSci 133, 144.** (Spring)

216 **Information Retrieval Systems** (3) Berkovich and Staff
Information organization and retrieval of natural language data by digital computer systems, statistical, syntactic, and logical analysis of natural language, dictionary and thesaurus systems, searching strategies and cataloging. Large-scale file structures. Prerequisite: CSci 144 or permission of instructor. (Spring)

217 **Computing Algorithms I** (3) Youssef and Staff
Design and analysis of basic classes of algorithms: divide-and-conquer, greedy, dynamic programming, tree and graph traversals, backtracking, branch-and-bound. Applications to problems such as sorting and searching, graph coloring, traveling salesperson, knapsack, and scheduling. Lower bound theory. NP-complete problems. **Prerequisite: CSci 131, 144.** (Fall and spring)

218 **Computing Algorithms II** (3) Choi and Staff
Graph algorithms, strongly connected components, biconnected components, dominators in acyclic graphs, ordered trees, network flow, planarity testing, bipartite matching, theory of NP completeness, NP-complete problems. Design and analysis of approximation algorithms for NP-complete problems. Prerequisite: CSci 217. (Spring, odd years)

219 **Computer Graphics II** (3) Hahn and Staff
Curves and surfaces. Spatial sampling and aliasing. Visible surface algorithms. Illumination and shading models, raytracing and radiosity. Image manipulation and texture mapping. Procedural models. Prerequisite: CSci 185. (Spring)

220 **Pattern Recognition** (3) Loew and Staff
Random vectors, transformations. Hypothesis testing, error probability, sequential methods. Bayes, other linear classifiers. Parameter estimation, learning, and dimensionality reduction. Nonparametric methods, clustering, feature selection and ordering. Syntactic methods: grammatical inference. Computer applications and projects. **Prerequisite: EE 204.** (Fall, odd years)

221 **Adaptive Learning Systems I** (3) Beck and Staff
Learning as an alternative to rule-based schemes for artificial intelligence. Deterministic and probabilistic simulation of games. Markovian and bounded-context systems. The algedonic process. Introduction to collective learning systems theory. Design, simulation, and evaluation of collective learning automata. **Prerequisite: ApSc 115; CSci 174.** (Fall)

222 **Design of User–Computer Dialogues** (3) Sibert and Staff
Design of dialogues for interactive systems. Psychological, physiological, linguistic, and perceptual factors. Advantages and disadvantages of various interaction techniques, command language syntaxes, and data presentations. Design methodology and guidelines. Case studies, research readings, and projects. Prerequisite: CSci 144 or permission of course director. (Spring)

223 **Graph Theory and Applications** (3) Choi and Staff
Undirected and directed graphs. Connectivity, partitions, cuts and matchings. Edge and vertex coloring, chromatic polynomials, and the four-coloring problem. Planar graphs and Kuratowski's theorem. Properties of random graphs. Applications to a variety of problems. (Spring, odd years)

224 **Artificial Intelligence** (3) Bock and Staff
Representation and space search. Heuristic search. Predicate calculus. Knowledge representation and knowledge engineering for expert systems. Rule-based, hybrid, and O-O systems. Semantic nets, frames, and natural language. Theorem provers. Overview of planning, learning, neural nets. Use of AI languages. Prerequisite: CSci 174, 232. (Fall and spring)

226 **Robotics Survey** (3) Bock and Staff
Manipulator and sensor technology. Feedback loops and analog servos. Multiple degrees of freedom and coordinate systems. Joint space–work-space transformations. Point-to-point continuous path control. Robot control. Distribution of intelligence. Adaptive hierarchical control. Prerequisite: CSci 174. (Spring, even years)

227 **Database Systems** (3) Narahari and Staff
Concepts in management information systems. Inverted files and query systems. Editing, report generation, updating, and updating load. Tradeoff between direct access and indexed-sequential access. Construction of data-base management systems. Conceptual and logical design of a database. Prerequisite: CSci 144, 178. (Fall)

228 **Models of Cognition** (3) Bock and Staff
The central nervous system as a natural precedent for AI: structure and function of the neuron and neural networks, sensors and actuators, modular brain function. The cognitive process. Intelligence metrics. Genetics and self-organizing systems. Memory mechanisms. The psychological basis of learning and behavior. Prerequisite: ApSc 115; CSci 174. (Spring, odd years)

229 **Computer Security Systems I** (3) Hoffman and Staff
Techniques for security in computer systems. Authentication, logging, authorization, encryption, international criteria. Effects of operating systems and machine architecture, countermeasures, risk analysis systems. Companion course to EE 250. Prerequisite: CSci 144 or equivalent. (Fall)

230 **Information Policy** (3) Hoffman and Staff
Issues related to computers and privacy, equity, freedom of speech, search and seizure, access to personal and governmental information, professional responsibilities, ethics, criminality, and law enforcement. Examines policy issues using written, electronic, and videotape proceedings of recent major cross-disciplinary conferences. Prerequisite: CSci 131. (Spring, even years)

231 **Sequential Machines** (3) Friedman and Staff
Finite-state sequential machine theory and design, state identification, minimization lossiessness, state minimization in incompletely specified tables, partition theory, decomposition of machines, asynchronous machine design, structure simplicity, and design with ROMs and PLAs (planar logic arrays). Prerequisite: CSci 133, 182. (Fall, even years)

232 **Automata and Formal Languages** (3) Friedman and Staff
Regular expressions. Turing machines, recursive functions, predicate calculus, and computability. Formal language theory, including grammatical classification, recognizers, relationships between machines and grammars. Prerequisite: CSci 133, 140, 144. (Fall and spring)

235 **Parallel Computer Architecture** (3) Narahari and Staff
Introduction to high-speed computer architecture. Parallel architecture, memory and I/O subsystems. Principles of pipelining and vector processing. Pipeline computers and vectorization methods, examples of vector processors. Structures and algorithms for array processors. SIMD computers, interconnection networks, associative array processors. Prerequisite: CSci 182. (Fall, odd years)

236 **High-Performance Processors** (3) Alexandridis
Superpipelined, superscalar, and VLIW processors. Instruction-level parallelism. Multiple instruction issue and machine parallelism. Data dependencies, branch control hazards, and exceptions. Load/store architectures. Pipelined and multithreaded processors. Survey of current machines. Prerequisite: CSci 182. (Fall, even years)

239 **Comparative Computer Systems** (3) Youssef and Staff
Structures of computers and a system description language. History, characteristics, and philosophies of different computer structures. Special-purpose processors, multiprocessors, networks, and time-shared systems. Comparative

of computer families. Performance evaluation. Effects of software and technology on computer structures. Prerequisite: CSci 182. (Spring, odd years)

240 **Microprogramming** (3) Friedman and Staff
Basic concepts, techniques, and theory of microprogramming. Microprogramming languages, assemblers, and hardware simulators, including specific applications of these to the design of current computer systems and their interfaces with real-time systems. Prerequisite: CSci 182. (Spring, even years)

243 **Fault-Tolerant Systems** (3) Friedman and Staff
Fault-test generation for combination and sequential circuits, digital simulation as a diagnostic tool, design of easily tested and fault-tolerant systems. Prerequisite: CSci 182. (Fall, odd years)

244 **Data Communications** (3) Meltzer and Staff
Connection of computers into a distributed system. Network standard protocols, electrical interfaces, modems, multiplexers, concentrators, network switches, packet switching, data transmission techniques, error control, local and wide area networks, Internet working, multiserver networks, high-level protocols, distributed databases. Prerequisite: CSci 144, 182. (Spring)

245 **Computer System Performance** (3) Meltzer and Staff
Queuing models of computer systems and applications of queuing theory to computer modeling. Bounds on system performance. Mean-value analysis of computer systems. Modeling specific subsystems. Queuing models for analysis. Limitations of queuing models. Analysis of transaction processors and terminal-oriented systems. Prerequisite: CSci 182. (Fall, odd years)

247 **Systems Programming** (3) Maurer and Staff
Introduction to C++. Review of data structures and C. Classes and derived classes, single and multiple inheritance. Public, private, and protected members and member functions. Virtual functions and base classes. Overloaded functions and operators. Templates and exceptions. Introduction to object-oriented programming. Prerequisite: CSci 120, 131. (Spring, odd years)

256 **Design of Translators** (3) Choi and Staff
Introduction to programming language implementation. Overview of compilers, interpreters, and assemblers. Lexical analysis. Classical parsing techniques. Symbol tables and static semantic analysis. Code generation and run-time environments. Student-selected term project. Prerequisite: CSci 232, 258. (Fall, even years)

258 **Advanced Programming Languages** (3) Iliom and Staff
Issues in modern programming languages. Data abstraction. Classical and experimental control structures. Exception handling. Portability and standardization of programming languages. Comparison of paradigms such as imperative, functional, and object-oriented, trade-offs between compiled and interpreted language. Prerequisite: CSci 133, 144. (Fall and spring)

267 **Operating Systems I** (3) Rotenstreich and Staff
Concurrency, concurrent programming, deadlocks, hardware support for operating systems, resource management, virtual memory, introduction to distributed operating systems. Prerequisite: CSci 217. (Fall)

268 **Operating Systems II** (3) Rotenstreich and Staff
Advanced concurrency, distributed mutual exclusion, distributed deadlock detection, fault tolerance in distributed systems, load balancing, job migration, transactions and concurrency control, checkpointing and rollback, issues in distributed and parallel environments. Prerequisite: CSci 267. (Spring, even years)

270 **Software Engineering** (3) Rotenstreich
The life-cycle model. Requirements and specifications. Design models, structured and object-oriented design. Program development. PDL's, tools, configuration control. Program, unit, and integration testing. Program verification. Other development models. Development metrics. Computer-aided software engineering (CASE). Prerequisite: CSci 217, 258. (Spring)

271 **Software Engineering Development** (3) Rotenstreich and Staff
Formal methods in software engineering. First-order logic, basic specification elements, rigorous proofs, formal development process, concurrency. Prerequisite: CSci 217. (Fall)

275 **Design and Implementation of Educational Software** (3) Martin and Staff
History and types of computer-based learning (CBL). Models of learning theory and instructional design. Scripted and generative design strategies. Use of authoring

systems. Intelligent tutoring systems. Dissemination, legal issues. Overview of research issues in CBL. Project required. Prerequisite: CSci 276. (Spring)

276 **Object-Oriented Design** (3) Rotenstreich and Staff
Object-oriented systems, software reusability, software modularity, top–down and bottom–up approaches, object classification, genericity, metaprogramming, concurrent object-oriented programming languages. Prerequisite: CSci 268. (Spring)

278 **Design of Interactive Multimedia** (3) Heller and Staff
History, theory, and development of multimedia concepts. Hardware components, platforms, and authoring tools. Scientific, technical, and cognitive foundations of various media including text, sound, graphics, and video. Interface design. Use of a media taxonomy as a design and evaluation tool. Completion of a multimedia portfolio required. Prerequisite: CSci 144. (Fall)

281 **Solutions of Algebraic Systems** (3) Pardavi-Horvath and Staff
Numerical solutions of linear algebraic equations and the algebraic eigenvalue problem. Sparse matrix techniques. Solutions of nonlinear simultaneous equations. Interpolation and extrapolation. Prerequisite: CSci 155. (Fall, even years)

282 **Solutions of Ordinary Differential Equations** (3) Pardavi-Horvath and Staff
Numerical solutions of problems in one dimension. Calculus of finite differences in the derivation of the solution methods. Numerical quadrature, zeros of functions and zeros of polynomials; finite difference, predictor–corrector, and Runge–Kutta methods; boundary-value and eigenvalue problems of ordinary differential equations. Prerequisite: advanced calculus. (Spring, even years)

297 **Special Topics** (1 to 3) Staff
Topics to be announced in the *Schedule of Classes*. (Fall and spring)

298 **Research** (arr.) Staff
Applied research and experimentation projects, as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

318 **Parallel Algorithms** (3) Yesha
Design and analysis of parallel algorithms. Topics include shared- and distributed-memory parallel computation models, graph algorithms, divide-and-conquer algorithms, numerical problems, parallel algorithms for combinatorial optimization methods. Prerequisite: CSci 217, 235. (Spring, even years)

319 **Computer Graphics III** (3) Hahn and Staff
Advanced topics in computer graphics. Computer animation, spatial and temporal anti-aliasing; hidden-surface algorithms, illumination models, ray-tracing, procedural models; texture mapping. Survey of current literature. Prerequisite: CSci 219. (Spring, even years)

320 **Computer Vision** (3) Loew and Staff
Image processing; edge detection, segmentation, local features, shape analysis, region description in 2D and 3D. Insights from human vision. Representations for vision: object models, synthetic images, matching, gaps, algorithms, inference, production system, syntactic networks. Planning, spatial reasoning for robot vision. Prerequisite: CSci 220, 224. (Spring, even years)

321 **Adaptive Learning Systems II** (3) Bock and Staff
Alternative memory structures. Selection and modification policies. Environmental models and evaluation policies. Metrics for performance evaluation of collective learning systems automata. Self-organizing, hierarchical networks of collective learning cells. Prerequisite: CSci 221, 224. (Spring, odd years)

322 **Natural Language Understanding** (3) Bock and Staff
The state of the art of natural language parsing and semantic understanding in computer systems. Review of formal, context free, and transformational grammars and parsing. Augmented transition networks, problems of complexity, semantics, and context. Deterministic parsing and semantic parsing. Prerequisite: CSci 224. (Spring, odd years)

324 **Knowledge-Based Systems** (3) Bock and Staff
The design, structure, and application of knowledge-based systems. Topics include acquisition, representation, and processing of expert knowledge, knowledge based system architectures, development tools, and user interfaces. Survey of existing knowledge-based systems. Student projects involve development of expert systems and development tools. Prerequisite: CSci 224. (Fall)

327 **Advanced Information Systems** (3) Berkovich and Staff
Special topics, such as architecture of information systems, organization of large dynamic files, multidimensional search, user interfaces, and database machines. Students are encouraged to present reports in information systems research. Prerequisite: CSci 131 and one course chosen from CSci 215, 216, or 227, or permission of course director (Fall, odd years)

329 **Computer Security Systems II** (3) Hoffman and Staff
Intrusion detection. Viruses, worms, and other rogue programs. Advanced risk analysis methodologies, developing international standards, and computer security models, such as those of Bell and LaPadula, Biba, and Clark and Wilson. Computer network security. Advanced protection against statistical inference. Web security. Biometrics. Prerequisite: CSci 229. (Spring, odd years)

335 **Advanced Computer Architecture** (3) Narahari and Staff
Array processors, SIMD computers, performance enhancements, multiprocessor architecture, MIMD processors. Interconnection networks, memory organization, concurrency problems. Multiprocessing control algorithms, deadlock problems, synchronization, parallel algorithms, data flow computers. Prerequisite: CSci 235. (Fall, even years)

337 **VLSI Systems Organization** (3) Berkovich and Staff
Impact of VLSI on computer systems design. Computational models for concurrent processing. Parallel algorithms. Concept of cellular automaton. Processor arrays. Associative processing. Computer communications. Redundancy and reliability. Specialized applications of VLSI systems. Prerequisite: CSci 217, EE 214, or equivalent. (Fall, even years)

358 **Concurrency and Parallelism** (3) Feldman and Staff
Programming language models for the support of concurrency, parallelism, and distributed processing. Tasks and rendezvous, semaphores, synchronization, monitors, and message passing. Language support for distributed processing. Student projects. Prerequisite: CSci 258 or permission of instructor. (Spring, odd years)

378 **Research and Evaluation of Interactive Multimedia** (3) Martin and Staff
A seminar course that focuses on research and evaluation. Investigation of research methodologies, experimental design, and evaluation protocols. Development of research hypothesis, experimental design, development of evaluation protocols, and implementation of the protocol to evaluate interactive multimedia applications. Prerequisite: CSci 222, 275, 278, or permission of instructor.

380 **Multimedia Project Development** (3) Heller and Staff
A seminar on total project design and development of interactive multimedia. Appropriate hardware and software platforms, system design and development productivity tools, project management, dynamics of team-based project development, cost analysis, prototyping, pilot testing, and evaluation. Significant team projects. Prerequisite: CSci 275. (Spring)

390 **Colloquium** (0) Staff
Lectures by outstanding authorities in electrical engineering and computer science. Topics to be announced each semester. (Fall and spring)

391 **Computer Science Research** (arr.) Staff
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Science candidates. May be repeated for credit.

ENGINEERING MANAGEMENT

Professors H.M. Sterner, R.C. Waters (*Chair*), F.L. Murphree, Jr., B.G. Silverman, H. Eisner, G.R. Bitz, J.R. Harrald, T.A. Mazzuchi, J.P. Deason, G.M. Gerson (*Visiting*)

Professional Lecturers W.A. Goetz, S.F. Pauls, H.S. Kimmel, C.C. Myers, Jr., R.W. Kopka, G.J. Patton, S.O. Marsden, N. Gerstanzang, F. Hatfield, A. Prorka, R.M. Andersen, G.M. Gerson, S.M. Wander, A.J. Murray, F.R. Power, W.P. Henderson, M.G. Goedde, F.H. Sweeney, F. Allario, C.R. Cothern, R.S. Cutler, W.T. Marquitz

Associate Professor M.L. Dennell

Associate Professional Lecturers R.D. Hofler, B.A. Brower, K.J. O'Connell, P.C. Tseng, F. Suber, Jr., P.A. Massumm, P.G. Meikle, J.E. Felch, Jr., B.L. Lewis, M.A. El-Mikawi

Assistant Professors L. Xue, M.R. Duffey
Assistant Professorial Lecturers S.M. Janssen, S.V. Massimini, A. Green, H.M. Kominars

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

204 **Management of Engineering Contracts (3)** Elsner and Staff
Study of the total contracting process (including initial budget preparation and justification, execution of a contract, and administration of the contract to completion) considered from the viewpoints of the industrial and government buyer and the seller of technical materials and services. (Fall and spring)

207 **The Human Resources Function for Engineering Managers (3)** Donnell and Staff
Principles, theory, and practical considerations of the human resources function for engineering managers, with applications for engineering management. Issues and case studies examined within the context of the totality of the process of management as well as the dynamics of human resources management. (Fall)

210 **Engineering Law (3)** Murphree and Staff
Legal principles and procedures of interest to engineers. The American legal system, contracts and specifications, liability of professional engineers, product liability, agency relationships, patent and proprietary rights, special problems in research and development contracts. (Spring)

211 **Organizational Behavior for the Engineering Manager (3)** Donnell and Staff
Behavior at the engineering organization level. Emphasis on changing engineering organizations and their cultures and on increasing their effectiveness. Includes evaluating and selecting engineering organization structures, considering influences on their design, and reviewing work design and encouraging innovation. (Fall, spring, and summer)

212 **The Management of Technical Organizations (3)** Waters and Staff
The practice of management as applied within technical organizations. Includes history of the tradition and current effective practices, research findings, and case studies, with objectives of enhanced understanding of external and internal factors influencing organizational performance and leadership requirements. (Fall and spring)

216 **Research Methods for the Engineering Manager (3)** Donnell and Staff
Advanced course in research, experimental, and statistical methods for engineering management doctoral and master's students who need to write a thesis or dissertation. Prerequisite: EMgt 170 or permission of instructor. (Fall)

217 **Fundamentals of Artificial Intelligence (3)** Donnell and Staff
History of AI, expert systems, knowledge representation, search and control techniques, natural language processing, computer vision, computer-speech robotics, knowledge-based systems, evidential reasoning, and features of the LISP and PROLOG languages. Hands-on experience with a knowledge-based shell. Laboratory required. (Spring)

218 **Management of Information and Systems Security (3)** Donnell and Staff
Development and management of effective security systems. Includes information, personnel, and physical security. Emphasis on risk analysis for information protection. (Spring)

219 **Object-Oriented Analysis and Design (3)** Donnell and Staff
The object-relationship model and the object-behavior model. Managing complexity with views and high-level modeling in object-oriented systems analysis. The concepts, the method, and applications, including object-based and object-oriented languages. Prerequisite: EMgt 251. (Spring) Deason and Staff

220 **Policy Factors on Environmental and Energy Management (3)**
Exploration of the policy development process from several different and integrated perspectives. Focus on areas of environmental and energy management and use of current case studies to develop a framework of understanding to support decisions in a broad variety of management settings. Deason and Staff

221 **Environmental Management (3)**
Technical, economic, political, administrative, and social forces influencing the quality of the environment and the use of resources. Government and industrial

programs to combat pollution of the air, soil, and water. Existing and pending pertinent legislation; theoretical aspects of specific management problems, tools for assessing environmental impact. (Fall)

222 **Energy Management** (3) Deason and Staff
The function of the energy management office of a large organization, including planning, staffing, conducting energy audits, setting priorities, acquiring energy technology, and maintaining energy budgets. An energy conservation project is encouraged. (Spring)

223 **Air Quality Management** (3) Deason and Staff
Explores the nature of critical local, regional, continental, and global problems associated with air pollution, covering historical evolution of such problems. Examines the complex regulatory and institutional framework, concepts, and practices controlling air quality management in the U.S. Prerequisite: EMgt 221 or permission of instructor. (Spring)

224 **Analytical Tools in Environmental Management** (3) Deason and Staff
A survey course in environmental management, focusing on tools to assess the environment: cost benefit analysis, land use, comprehensive planning, Congressional activities, and environmental laws. The regulatory process as it relates to environmental management. Risk assessment methodology. Modeling approach to solving environmental problems. (Spring)

225 **Hazardous and Toxic Waste Management and Cleanup** (3) Deason and Staff
The objective of this course is to develop a working knowledge of the hazardous and toxic waste management and cleanup processes used in the U.S. The roles and missions of federal, state, and local government agencies, relevant laws and regulations, and other management functions. Prerequisite: EMgt 221 or permission of instructor. (Fall)

226 **Water Quality Management** (3) Deason and Staff
Examines the nature of point and non-point sources of surface and ground water pollution and the statutory, regulatory, and institutional framework controlling water quality management activities in the U.S. Current approaches to water quality protection and enhancement. Prerequisite: EMgt 221 or permission of instructor. (Fall)

231 **Program and Project Management** (3) Eisner and Staff
Basic instruction in the use of the Critical Path Method (CPM) for project and program planning; computers for project management, Primavera computer software; project organization for on-site management, cost accounting, multi-project (program) management; resource management for the project, extensive use of computers to solve project-related problems. (Fall)

241 **Introduction to Management of Construction** (3) Murphree and Staff
How the construction industry world wide works: feasibility studies, organization for construction, financing and cost accounting for construction; design and engineering contracts and procedures, construction contracts, change orders and delays, acceleration, claims, arbitration, mediation, litigation, labor management; project planning. (Fall)

242 **Construction Project Management** (3) Murphree and Staff
Applications of CPM concepts, owner and contractor viewpoints and needs, subcontractor relations and control, use of computer software (Primavera) to follow an example construction job from concept through design and contract award, and construction, attention to change orders, weather-caused changes to plans, and other delays, acceleration, claims, job closeout. (Spring)

243 **Construction Cost Management** (3) Murphree and Staff
Cost estimating and control for owner and contractor from project concept through construction, operation and maintenance, to disposal. Parametric cost estimating, budget estimates during design; detailed quantity takeoff and pricing from completed designs, bid preparation, financing alternatives, cost control during construction; computers in cost control. (Fall)

245 **Facilities Operation and Maintenance Management** (3) Murphree and Staff
Economic issues in facilities management, planning and organization for maintenance, energy and environmental issues, strategies, day-to-day operation and maintenance, estimating with standard production models, computers in maintenance operations, contracts for maintenance, preparation and administration, facility obsolescence, recycling and disposal. (Spring)

251 **Information and Software Engineering** (3) Harrald and Staff
Introduction to analysis and design of information systems including requirements analysis, project management, and software architectures. Introduction to CASE tools. Prerequisite: EMgt 254 or permission of instructor. (Fall, spring, and alternate summers)

253 **Production Design** (3) Duffey and Staff
Consideration of production design and operations in the context of an integrated company strategy. Process and trade-off analyses, capacity management and planning, technology planning. (Spring)

254 **Computer Systems in Information Management** (3) Harrald and Staff
Introduction to computer and communications technology used in information systems. Emphasis on microcomputers and network hardware and software concepts. Includes a survey of information systems from a management perspective. (Fall, spring, and summer)

255 **Management of Research and Development** (3) Waters and Staff
Study of technological innovation as a vital part of the organizational adaptation process. Role of the technical manager in using organization, planning, and motivation to accomplish research and development objectives. (Fall)

256 **Information Management and Information Systems** (3) Harrald and Staff
The use of information in organizations, the management of the information resource; the impact of information and communication technology. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)

260 **Survey of Finance and Engineering Economics** (3) Waters and Staff
Survey of material from accounting, finance, and economics relevant to engineering activity. Includes traditional engineering economy topics, fundamentals of accounting, and financial planning, budgeting, and estimating applicable to the management of technical organizations. (Fall, spring, and summer)

261 **Economic Analysis in Engineering Planning** (3) Brier and Staff
Case studies in economic analysis, capital budgeting, the price system and its adjustments, socioeconomic analysis. (Fall and spring)

262 **Finance for Engineers** (3) Waters and Staff
Financial analysis and concepts useful to engineers: sources and uses of funds, management of working capital, leverage, valuation, forecasting, investment decisions. Prerequisite: EMgt 160 or 260. (Fall and spring)

265 **Transportation Management I** (3) Waters and Staff
Integration of social, technical, economic, and political considerations that shape transportation systems and their management. Focus on modal histories and relative advantages. (Fall)

266 **Transportation Management II** (3) Waters and Staff
Investigation of the economics and management of a transportation mode. Emphasis U.S. and international perspectives. Topics include impact of technology, deregulation, and politics on the provision of transportation. (Spring)

269 **Elements of Problem Solving and Decision Making for Managers** (3) Mazzuchi and Staff
Problem formulation. Concepts and techniques used in analyzing management problems. Modeling decision problems using decision trees, probability models, multi-objective models and utility theory. Class examples using computer application packages. Prerequisite: EMgt 170. (Fall, spring, and summer)

270 **Knowledge Engineering of Expert Systems** (3) Silverman and Staff
Methods of knowledge engineering for expert systems, including literature reviews, knowledge acquisition, ontological engineering, knowledge-base design/implementation/verification/maintenance. Hands-on work with automated knowledge engineering tools. (Fall)

281 **Systems Analysis and Management I** (3) Eisner and Staff
The systems or holistic approach as a methodology for making decisions and allocating resources. Analysis by means of objectives, alternatives, models, criteria, and feedback. Prerequisite: EMgt 269 or equivalent. (Fall)

282 **Systems Analysis and Management II** (3) Eisner and Staff
Case studies in systems analysis, including applications to industrial, economic, and military situations. Prerequisite: EMgt 281 or permission of instructor. (Spring)

283 **Systems Engineering I** (3) Eisner and Staff
Systems approach to the architecting and engineering large-scale systems; elements of systems engineering, methods and standards; computer

that support systems and software engineering, trends and directions; the integrative nature of systems engineering. (Fall and spring)

284 **Systems Engineering II** (3) Eisner and Staff
Specific applications of systems engineering tools and techniques, student projects. Prerequisite: EMgt 283 or equivalent. (Spring)

285 **Seminar: Management Issues** (3) Waters and Staff
Explores the evolution of human organizations, particularly with respect to economic development, in order to assess the role of management in the process of societal evolution. (Spring)

287 **Decision Support Systems and Models** (3) Silverman and Staff
Theory of decision making—a cognitive view. Modeling decision maker heuristics and processes. Design, implementation, and evaluation of state-of-the-art DSS (hands-on). Assess impact of behavioral, situational, and organizational variables. (Fall, spring, and summer)

288 **Technology Issue Analysis** (3) Eisner and Staff
Contextual background and intellectual basis for addressing technology issues in the public and private sectors. Technology impact assessment, forecasting, and innovation; principles and practices of technology transfer as elements of a systematic approach to making technology decisions. (Fall)

290 **Human Factors Engineering** (3) Donnell and Staff
Study of the human–machine interface applied to system design, job design, and technology management. Human sensory–motor, perceptual, and cognitive functions, task analysis and allocation; contextual aspects of human factors engineering. Modeling, design, and evaluation methodologies. Applications to user-centered industrial and information systems. (Fall)

293 **Technical Enterprises** (3) Murphree and Staff
Essential features of technology-based companies from the entrepreneur's point of view. Team management of an enterprise in a computer-simulated environment. Designed for those working in technical firms and for government personnel who depend on technical firms as suppliers. (Fall)

294 **Marketing of Technology I** (3) Xue and Staff
Analysis of industrial marketing process and functions, providing concepts and tools for engineering managers to market high technology products and services. (Fall and spring)

295 **Database Design and Database Management Systems** (3) Harrald and Staff
Concepts, strategies, and features of database design and management. Analysis, design, and implementation of database systems for micro and mainframe applications. Development of a microcomputer database system. Prerequisite: EMgt 254 or permission of instructor. (Fall, spring, and alternate summers)

296 **Software Project Development with CASE** (3) Harrald and Staff
Evaluation and selection of CASE tools, use of CASE tools in software design/project. Graphical user interface and re-engineering tools. Open only to master's candidates in the department during the last semester of their program. Prerequisite: EMgt 251. (Fall, spring, and summer)

297 **Problems in Engineering Management** (3) Waters and Staff
Project course providing the opportunity to apply concepts and tools previously studied to the solution of an actual problem in engineering management. Students work in small groups, on a problem proposed by students and approved by the instructor. Open only to master's candidates in the department during the last semester of their program. (Fall, spring, and summer)

298 **Research** (arr.) Staff
Basic or applied research in engineering management or systems analysis. Open to master's degree candidates in the department. May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

311 **Marketing of Technology II** (3) Xue and Staff
A systematic treatment of global marketing in the context of U.S. industrial competitiveness. Emphasis on understanding the global technical and marketing environment and formulating marketing strategies. (Spring)

321 **Data Communications and Networks** (3) Harrald and Staff
Technical and managerial aspects of data communications, with emphasis on communication networks. Methodologies used in data communications, communication networks, and distributed data processing. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)

344 Construction Management Seminar (3) Murphree and Staff
Timely issues, recent research findings; guest speakers from the construction industry; in a seminar setting, students make presentations of personal research results; applications of high technology in construction management; special emphasis given to productivity in construction. (Spring)

370 Inventive Thought, Cognition, and Computers (3) Silverman and Staff
Human information process, memory, and normative vs. descriptive cognitive modeling; designing knowledge-based systems for inventing. Cognitive models of inventors, project managers, and caseworkers are considered; adaptive knowledge-based systems, expert database systems, machine learning systems. Prerequisite: EMgt 270. (Spring, even years)

386 Advanced Topics in Management (3) Murphree and Staff
Reading and discussion of classical and recent literature concerning the philosophy and application of management principles. Total quality management concepts and techniques are covered, as are applications of statistical process control. (Fall, odd years)

387 Technological Forecasting and Management (3) Xue and Staff
Concepts and methods for understanding the dynamics of technological change. Issues in technology assessment, technology transfer, and strategic management of technology. (Fall)

388 Cost Effectiveness (3) Duffey and Staff
Advanced problems in engineering economic analysis. Prerequisite: EMgt 261 or equivalent with permission of instructor. (Spring, odd years)

390 Human–Computer Interaction (3) Silverman and Staff
The human factors of interactive computing. Fundamentals of cognitive psychology, linguistics, computer science, and management science applied to the design and development of interactive computer systems: user modeling, requirements analysis, human–computer interface design, new systems implementation. (Spring)

394 Advanced Study (arr.) Staff
Limited to professional degree candidates in the department. May be repeated for credit.

395–96 Professional Project Research (3–3) Staff
Limited to professional degree candidates in the department.

398 Advanced Reading and Research (arr.) Staff
Limited to Doctor of Science candidates. May be repeated for credit.

399 Dissertation Research (arr.)
Limited to Doctor of Science candidates. May be repeated for credit.

ENGINEERING SCIENCE

See **Civil, Mechanical, and Environmental Engineering**.

ENGLISH

Professors R.N. Ganz, Jr., J.H. Maddox, G. Paster, J.A.A. Plotz, I.A. Quitslund, C.W. Sten (*Chair*), D. McAleavey, O.A. Seavey, L.B. Salamon, R. Sunder Rajan (*Visiting*), J. Romines

Associate Professors G.R. Bozzini, R.L. Combs, G. Carter, K. Moreland, M.S. Schiro, D. Moshenberg, M. Alcorn, J. Shore, F. Moskowitz, T.G. Wallace, M.D. Clair, J.M. Greer, Lewis

Associate Professorial Lecturer P. Griffith

Assistant Professors M.V. Dow, S.P. Willens, P. Chu, I.I. Cohen, P. McGann, J. Pa... G. Wald, V. Chandra, S. Wolf, E. Schreiber, J. Harris, A. Hewett, R. McRuer, R. Samuels

Adjunct Assistant Professors J. Bolz, D. Scarboro, C. Gamber, S. Maley, A. Wilkerson

Adjunct Instructors D.A. Bruno, S. Gold, P. Presser

Jenny McKean Moore Writer in Washington D. Vilmure

Master of Arts in the field of American literature or *Master of Arts in the field of English literature*—Prerequisite: a Bachelor of Arts degree with an undergraduate major in English or American literature, or 24 credit hours in English or American literature at the sophomore level

Required: the general requirements stated under Columbian School of Arts and Sciences, including (1) 24 credit hours of course work planned in consultation with ...

department advisor; (2) Level One proficiency (translation of a passage with a dictionary) in an approved foreign language (French, German, Italian, Spanish, Greek, or Latin); (3) a Master's Comprehensive Examination in American or English literature, to be passed at the end of the third semester; and (4) a master's thesis (6 credit hours) on an approved topic, directed by a member of the department's graduate faculty. Students must maintain a grade-point average of at least 3.25.

Doctor of Philosophy in the field of American literature or Doctor of Philosophy in the field of English literature—Prerequisite: a Bachelor of Arts degree with an undergraduate major in English or American literature, or 24 credit hours in English or American literature above the sophomore level.

Required: the general requirements stated under Columbian School of Arts and Sciences, including satisfactory completion of (1) 72 credit hours of course work (48 for students with M.A. degrees in English) planned in consultation with the department advisor; (2) Level Two proficiency (translation of a passage without a dictionary) in an approved foreign language, or Level One proficiency (translation with a dictionary) in two approved foreign languages (French, German, Italian, Spanish, Greek, or Latin); (3) a qualifying examination in American literature or English literature, to be passed by the end of the third semester, and a field examination, to be completed by the end of the second year, in a period or a genre related to the proposed dissertation topic; (4) a dissertation proposal, which must be aproved no later than the end of the third year of enrollment in the program, and (5) a dissertation on an approved topic, directed by a member of the department's graduate faculty and completed by the end of the fourth (or possibly fifth) year of study.

Each student plans a program of studies in consultation with the department advisor and a committee of the graduate faculty. Students must maintain a grade-point average of at least 3.5. The fields for the period examination are Early Modern English (1500–1660); 18th-Century English (1660–1800); Early American (beginnings to 1815); 19th-Century English and/or American; 20th-Century English and/or American; African American (1650 to the present); and Asian-American (1800 to the present). The fields for the genre examination are drama, prose fiction, poetry, and criticism.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs bulletin for course listings.

Note: All graduate English courses from Engl 205 forward may be repeated for credit with permission of the director of graduate studies.

201 **Introduction to Graduate Studies in English** (3) Romines, Wallace
Introduction to methodology for researching, writing, presenting, and publishing literary scholarship, to faculty and area resources, to current professional issues. Instruction in electronic research. (Fall)

202 **Modern Theory of Rhetoric** (3) Alcorn, Moshenberg
The rediscovery of rhetoric in 20th-century criticism and pedagogy. Rhetorical orientations toward language, cultural and intellectual contradictions that shape the practice of contemporary rhetoric, theories and methods of teaching composition. (Fall)

203 **Textual Theory and Practice** (3) Alcorn, Paster, Soltan
An examination of theoretical models that describe the nature and function of language. Readings in influential texts that explore issues of representation, knowledge, power, subjectivity, ideology, other familiar terms.

204 **Literary Criticism and Theory** (3) Cohen, Soltan
In order to clarify the character and utility of various contemporary theoretical approaches to literary works, two or three texts are analyzed from points of view of deconstruction, New Historicism, gender studies, and other theoretical problems.

205 **Advanced Literary Theory** (3) Cohen, Paster, Soltan, Wallace
The course focuses on a major figure or topic in theory (e.g., Foucault, Lacan, Barthes, Kristeva, Bakhtin, post-Marxist theory, language and power, the canon).

212 **Medieval Period** (3) Cohen
Topics in medieval writing and culture (700–1500). Emphasis on critical theory and the Middle Ages, centered around an organizing topic (gender, race, deviance, subjectivity, etc.).

221–22 **Renaissance Period** (3–3) Paster, Quitslund
Topics in the development of English literary culture from the Elizabethan regime to the Interregnum, with reference to forms of authority, images of the past, performance and textual production, and other topics. Engl 221: verse and prose; Engl 222: dramatic literature.

223 **Studies in Early American Culture** (3) Seavey
The interrelation of American literature and culture, 1607–1820. Literary texts, historiography, religious issues. Same as AmSt 273.

227–28 **Seventeenth and Eighteenth Centuries** (3–3) Wallace
Seventeenth- and eighteenth-century English literary cultures considered in terms of constructions of modern subjectivity, the beginnings of public/private and gender dichotomies, emergence of "English" imperialism, and other topics.

231–34 **Nineteenth Century** (3–3–3–3) Green-Lewis, Moreland, Plotz, Romines, Seavey, Sten, Wallace
Topics in British and American nineteenth-century writing and culture, exploring national traditions and international movements and issues, such as Romanticism, Realism, and others.

235–38 **Twentieth Century** (3–3–3–3) Chu, Green-Lewis, McAleavey, Moreland, Moshenberg, Romines, Soltan, Sten, Wald, Wolf
Topics in twentieth-century British and American writing and culture, exploring national traditions and international movements and issues, such as literary modernism, anti-modernist and post-modernist currents, others.

240 **Writing Race and Nation** (3) Chu, Sten, Wald
The course uses literary culture to explore intersections of origins and evolution of racial and ethnic identities and national myths and political objectives.

241 **Conceptualizing Genders** (3) Cohen, Paster, Wald, Wallace, Wolf
Structures of sex and gender difference considered historically and theoretically, including masculinity/femininity, sexualities, and their textual representations.

242–43 **Studies in Genre** (3–3) McAleavey, Paster, Quitslund, Wolf
Questions of genre, considered theoretically and practically. Content varies.

244 **Ethnicity and the Construction of Identity** (3) Chu, Sten
Literary culture is used to explore how individuals, communities, and societies construct self-awareness and knowledge about others for cultural exchange.

247 **Postcolonialism** (3) Plotz, Sunder Rajan
Postcolonial theory and texts by representative writers.

251 **Women and Writing** (3) Romines, Wald, Wallace
Selected topics in the traditions, theory, and texts of women's literary production and culture. Same as WStu 251.

261 **Selected Topics in Criticism** (3) Wald, Wolf
Topics may include cultural studies, film, gay/lesbian studies, others.

295 **Independent Research** (3) Staff
Written permission of instructor required. May be repeated for credit to a maximum of 9 hours.

299–300 **Thesis Research** (3–3) Staff

301–2 **Folger Institute Seminars** (3–3) Staff
Topics will be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. Consult the graduate advisor before registration.

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

ENVIRONMENTAL AND RESOURCE POLICY

Committee on Environmental and Resource Policy
H. Merchant (*Director*), H. Vandermer, A. Viterito

Columbian School of Arts and Sciences offers an interdisciplinary program leading to the degree of Master of Arts in the field of public policy with a concentration in environmental and resource policy. The program is directed by the Committee on Environmental and Resource Policy and draws upon faculty and relevant courses from various departments within the University.

The Environmental and Resource Policy Program presents in its core requirement a graduate-level examination of the specific areas that affect decisions made in the broad area of environmental and resource policy. This material includes the analytic tools required for decisions leading to effective policy regarding the environment and natural resources. In addition to mastering the core material, a student is also expected to develop specific competence in an area of particular interest by choosing an approved elective field. Prospective candidates should consult with the director of the Environmental and Resource Policy Program.

Master of Arts in the field of public policy with a concentration in environmental and resource policy—Prerequisite: a bachelor's degree with a *B* average (or equivalent) in a social science, natural science, or other relevant area from an accredited college or university and an introductory course in statistics.

Required:

(a) The general requirements stated under Columbian School of Arts and Sciences.

(b) Twenty-six hours of core courses selected from the following (students whose backgrounds include some of these courses may substitute additional courses in the elective field): BiSc 208, 243, Econ 217, 237, E&RP 210, 240, PSc 203, PAd 201, Stat 183 (or other appropriate statistical techniques course).

(c) Twelve hours of courses selected from those listed in one of the following elective fields. Check the Undergraduate Programs Bulletin for 100-level courses.

Earth Sciences: Geog 107, 108, 136, 137, 219, 220, Geol 105, 122, 128, 274

Ecology: BiSc 126, 154, 155, 156, 157, 167 or 168, or 169, 242, Geog 220, 290, 291

Energy: EMgt 221, 222, Geog 144, IAff 222, PSc 223, 224 (the School of Engineering and Applied Science offers many courses relevant to this area, some may be included in this program)

Resource Management: Econ 161, 162, Geog 132, 133, 222, 230, 290, 291

(d) Comprehensive Project—Undertaken at the completion of the student's program, the comprehensive project is the investigation of a specific problem in environmental and resource policy and the development of a proposed solution in a manner that integrates the core curriculum with the course work in the elective field.

210 Seminar in Environmental and Resource Policy (3) Merchant

Approaches to environmental decision making as related to the formation of environmental and resource policy. Emphasis on the development of a practical model to be used in the evaluation and incorporation of disparate information relevant to an environmental issue. Limited to degree candidates in the program or enrollment with permission of the instructor.

240 Environmental Impact Statement Procedures and Environmental Law (3) McGurl

The rationale for environmental impact statements from the viewpoint of the nature and origins of environmental concerns. Government agencies responsible for environmental impact statements; current statutes and regulations pertaining to the environment.

EPIDEMIOLOGY

Columbian School of Arts and Sciences offers the degrees of Master of Science and Doctor of Philosophy in the field of epidemiology. The School of Public Health and Health Services collaborates with the Department of Statistics and the Biostatistics Center in these degree programs. For the Public Health courses listed below, please contact the School of Public Health and Health Services.

Master of Science in the field of epidemiology—Prerequisite course work in multivariate calculus and matrix theory (Math 33 and 124), proficiency in computer applications (CSci 183 or PubH 251), and 6 hours of biology other than botany. With approval of the graduate director, applicants who lack some of the listed prerequisite course work may be admitted to degree candidacy and fulfill deficiencies during the first year of study; such course work does not count toward degree requirements.

Required: The general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 33 hours of course work, including Stat 157–58, 225, PubH 201, 202, 240, 245, 280, and 290. Two elective courses are chosen from either statistics or public health. A two-part Master's Comprehensive Examination is required.

Doctor of Philosophy in the field of epidemiology—Prerequisite: a master's degree in epidemiology or a closely related field, including the prerequisites listed under the Master of Science in the field of epidemiology. In some cases, an exceptionally well-prepared candidate may enter the program with a bachelor's degree.

Required: The general requirements stated under Columbian School of Arts and Sciences, including the required public health courses for the Master of Science in the field of epidemiology plus Stat 201–2, 224, and 225; PubH 205 and 291; and Stat/PubH 297. Electives are chosen from statistics and public health. At the end of the second year of study, a two-part General Examination is taken on biostatistics and epidemiology. A minimum of 12 hours of dissertation research is required; the dissertation must demonstrate the candidate's ability to do original research that develops methods or applications in the field of epidemiology.

Staff

295 Reading and Research (arr.)
May be repeated for credit. Staff

299–300 Thesis Research (3–3) Staff

398 Advanced Reading and Research (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Staff

399 Dissertation Research (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

EUROPEAN STUDIES

Program Committee: M.J. Sodaro (*Director*), H. Agnew, H.B. Feigenbaum, M. Gonglewski, C.J. Herber, S. Reeves, S.S. Rehman

Master of Arts in the field of European studies—The Elliott School of International Affairs offers a multidisciplinary program that provides a broad background in the history and politics of Western and Eastern Europe as well as analytical tools for understanding the domestic and international dynamics of contemporary Europe. The program is designed to provide skill-based professional training for those interested in government, business, and related careers in European affairs as well as strong academic preparation for those planning further study.

Prerequisite: The admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. In addition, degree candidates must satisfactorily pass a statistics course at the level of Stat 51, 53, or 111 with a grade of *B* or better. The course may be taken either before or after entering the program; it will not count as credit toward the degree.

Required: the general requirements stated under the Elliott School of International Affairs. The program consists of a minimum of 36 hours of course work. All students must take a field in European history and politics, consisting of three courses chosen from history, political science, or international affairs, and a field in international and European economics, consisting of Econ 217–18, 283, 284, and a third course identified by the program director. (Econ 217–18 may be waived on the basis of equivalent course work or via the Economics Department diagnostic exam.)

Students choose one of the following elective fields: international business and finance, policy analysis, economics, history, or political science. Typically, three courses are taken in the elective track. Students also have the option of taking up to 3 credits of IAff 297, and, in the final semester of the program, a capstone policy project.

All students take IAff 295 or, with approval of the program director, IAff 298, 3 credits.

During the final 18 hours of the program, students must pass a language examination demonstrating oral and reading proficiency in a major Western or Eastern European language or in Russian. Those who pass exams in one language and wish to study a second European language may do so. Up to 6 hours of language study may be counted toward the 36 hours for the degree, provided that Econ 217–18 has been waived. Consult the program guidelines for further details.

FINANCE

Professors F. Amling, T.M. Barnhill, W.E. Seale, W. Handorf, M.S. Klock (*Chair*), J. Kraft
Professorial Lecturer S. Uyanik
Associate Professors J.M. Sachlis, N.G. Cohen, P.S. Peyser, G.M. Jabbour, J.G. Haigh, N. Besnainou, M. Eppli

Associate Professorial Lecturer R. Strand
Assistant Professors A.J. Wilson, W.E. Wilson, M. Humber

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Accountancy, Master of Business Administration, Master of Science in Finance, and Doctor of Philosophy.

221 **Financial Decision Making** (3) Sachlis, Pevser, Klock
Theory and practice of business finance, emphasizing the impacts of long- and short-term uses and sources of funds on the firm's value. Prerequisite: MBAd 250. (Fall and spring)

222 **Capital Formation** (3) Handorf, Jordan
Determinants of saving and investment and resultant funds flow are evaluated. Special emphasis on the level and risk structure and term structure of interest rates. The role and management of financial institutions is stressed. Prerequisite: MBAd 250. (Fall and spring)

223 **Investment Analysis and Portfolio Management** (3) Amling, Cohen, Klock, Jordan, Bapeux
Risk–reward analysis of security investments, including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: MBAd 250. (Fall and spring)

224 **Financial Management** (3) Barnhill, Cohen, W. Wilson, Humber
Advanced case studies in domestic and international financial management; working capital policy, capital budgeting, financing with debt and equity, dividend policy, valuation, project finance, and mergers and acquisitions. Prerequisite: Fina 221. (Fall and spring)

231 **Seminar: Investment and Portfolio Management** (3) Amling
Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: Fina 223. (Fall)

234 **Bank Management and Regulation** (3) Staff
Consideration of a range of issues faced by bank managers. Financial models are developed to provide an analytical framework to assist decision making in the context of relevant regulatory restraints. Prerequisite: MBAd 250 and Fina 222 or permission of instructor.

235 **Futures Markets: Trading and Hedging** (3) Seale, A. Wilson
Organization and regulation of futures markets. Alternative strategies for trading of futures contracts for possible hedging uses. High risk–high return investment alternatives. The use of futures markets to manage risks. Prerequisite: Introductory courses in economics, statistics, computer usage, and financial management. Prerequisite: MBAd 250; recommended: Fina 221. (Fall and spring)

236 **Options** (3) Jabbour, Jordan
Pricing of options on financial instruments. Role of options in risk management, trading strategies, hedging implications for national and international investors, financial engineering, and structure and regulation of option markets. Prerequisite: MBAd 250, recommended: Fina 221. (Fall and spring)

237 **Personal Financial Advising** (3) Cohen
For students preparing to be personal financial advisors; the combination of taxes, pensions, investing, budgets, estates and trusts, and insurance into comprehensive personal financial plans. Regulation, professional ethics, and the economics of advisory firms. Extensive use of computer spreadsheets and case studies. Prerequisite: Fina 223, Accy 261 is recommended. (Spring)

239 **Financial Theory** (3) Pevser, Klock
In-depth theoretical analysis of financial topics, including asset management, financial structure, dividend policy, and the capital asset pricing framework. Prerequisite: Fina 221, 223. (Fall)

240 **Real Estate Development** (3) Staff
Examination of the forces that shape real estate development, market analysis methods and techniques to evaluate project feasibility, the institutional and legal framework within which real estate development occurs and that influences controls, land value, and development potential. (Fall)

241 **Financing Real Estate Development** (3) Eppl
Principles of real estate development finance; evaluating and measuring the investment attractiveness of real estate projects, obtaining, differentiating, and hedging sources of real estate funding, and appraising property. Incentives provided by local, state, and federal governments. Prerequisite: MBAd 250 or permission of instructor. (Fall and spring)

242 **Problems in Real Estate Valuation** (3) Eppl
Applications of market analysis, valuation, and financial techniques to the real estate development process.

245 **Land Development Law** (3) Staff
Selected problems in urban development; applications of zoning, environmental controls, tax incentives, and other techniques available for the implementation of development plans.

247 **Urban Development Economics** (3) Staff
Economic forces effecting urban growth and change; relationships among cities, metropolitan areas, and regions in the context of the national economy; socioeconomic implications of urban land development policies; basic statistics and methods of economic analysis. Prerequisite: Econ 218 or 219 or equivalent or permission of instructor.

248 **Real Estate Development Cases** (3) Staff
Case study analysis of large-scale commercial real estate developments to give comprehension of financial, political, legal, and technical complexities and constraints inherent in the real estate development process. Prerequisite: Econ 220 or permission of instructor.

Master of Science in Finance degree candidacy is prerequisite to Fina 271 to 282.

271 **Financial Modeling and Econometrics** (4) Sover, Kon
Applied statistical and econometric analysis and modeling in finance. Methodologies include descriptive and inferential statistics, multivariate regression, time series analysis, and simulation modeling. Empirical studies are reviewed and a series of research projects are undertaken. (Fall)

272 **Global Financial Markets** (4) Handel, Pya
Theories explaining domestic and international interest rate and exchange rate structures. Roles of financial institutions and markets are investigated and forecasting methodologies are applied. (Spring)

273 **Advanced Accounting Applications for Finance** (4) Sheldon, Smith
Intermediate financial accounting; international and tax accounting. Emphasis on computer modeling to analyze and forecast a firm's financial statements to reflect possible future performance. (Fall)

274 **Corporate Financial Management and Modeling** (4) Sachdev, Isaac
The foundation theories of business real investment and financing are summarized and applied in a simulation environment. Emphasis on understanding the causal connections between business decision making in a global economy and the resulting valuation of the firm's financial assets. Financial modeling and forecasting applications. (Fall)

275 **Investment Analysis and Global Portfolio Management** (4) Anling, Isaac
Financial markets and instruments viewed from the investor's perspective. Analysis of the value of equity and fixed-income securities and the construction of efficient portfolios in a global financial market. Issues of market efficiency, capital structures, and investment funds; computer-based models. (Spring)

276 **Derivative Securities, Risk Management, and Arbitrage** (4) Jacobs, Sover
Mathematical and theoretical foundations to value derivative securities, including options, futures, and swaps; hedging and trading applications of these contracts. Arbitrage trading across cash and derivative markets and its role in maintaining equilibrium prices. (Summer)

277 **Comparative Financial Market Regulation and Development** (4) Peyser
Theory and current status of comparative regulation of domestic and international financial institutions and markets. Effects on country economic development and international trade. (Fall)

278 **Financial Theory and Research** (4) Peyser, Kleo
Theoretical constructs of business investment and financing decisions and of financial asset pricing structures in domestic and international environments.

Analytical and numerical models are developed, and empirical studies are evaluated. (Spring)

279 **Real Estate Finance, Fixed-Income Security Valuation, and Special Topics** (4) Eppli
A primary focus is the application of financial theory to real estate investment and financing. Another is fixed-income security valuation and design and portfolio management. Application of decision support and artificial intelligence systems in making financial decisions. (Spring)

280 **Financial Institution Management and Modeling** (4) Handorf
Financial institution asset and liability management. A dynamic simulation model is developed and run under varying macroeconomic conditions as additional layers of complexity, involving multinational investment, borrowing, and hedging, are added. (Summer)

281 **Cases in Financial Management and Investment Banking** (4) Cohen
Through a series of cases and simulations, students address real financial problems faced by domestic and international companies, including capital budgeting, capital structure, mergers and acquisitions, and project financing. The negiotiating process by which many financial situations are resolved is emphasized. (Summer)

282 **Directed Research in Finance** (4) Staff
Students design and execute a financial research study, applying knowledge developed throughout the M.S. in Finance program. Class sessions vary from lectures on research methods to colloquia by outside professionals to critique studies. (Summer)

290 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods. May be repeated once for credit.

298 **Directed Readings and Research** (2 to 4) Staff

299 **Thesis Seminar** (3) Staff

300 **Thesis Research** (3) Staff

311 **Seminar: Public–Private Sector Institutions and Relationships** (3) Staff
Same as SMPP 311.

321 **Seminar: Financial Markets Research** (3) Peyser, Klock, Sachlis
Market efficiency, utility testing, the capital asset pricing model, the arbitrage pricing theory, the option pricing model, and aggregate market volatility. Prerequisite: Fina 239.

322 **Seminar: Corporate Finance Research** (3) Peyser, Klock, Sachlis
Capital budgeting, capital structure issues, dividend policy, microeconomic foundations, mergers, and agency theory. Prerequisite: Fina 239, Mgt 202 or MBAd 220.

396 **Advanced Reading and Research** (arr.) Staff
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

990 **Dissertation Research** (arr.) Staff
Limited to doctoral candidates. May be repeated for credit.

FORENSIC SCIENCES

Professors I.E. Starrs, T.F. Courtless, Jr., C. O'Rear, W.F. Rowe (*Acting Chair*)
Associate Professional Lecturers K.E. Melson, M.M. Christian, J.G. Jackson, S.C. Cogswell
Associate Professor N.T. Lappas
Assistant Professional Lecturers S.R. Longo, R.W. Cotton
Professor Emeritus R.V. Ferris, D.A. Pluchinsky, D.C. Mount, E.M. Robinson, S.J. Cribari, G.B. Fowler, G.E. McAdams, D.I. Salem, T. Spitzer

Master of Forensic Sciences—Prerequisite: a bachelor's degree from an accredited institution of higher learning and academic or professional experience in the behavioral, biological or physical sciences or in law, medicine, or law enforcement.

Students must meet the general requirements stated under Columbian School of Arts and Sciences. Students must complete 36 credit hours of approved course work; students electing to write a thesis must complete 30 credit hours of course work plus a thesis (negative... credit hours). ForS 220, 221, 224, and 225 are required of all students. ForS 224

may be waived for students having an LL.B. or J.D. degree from an accredited law school. The following are also required: (1) 9 hours selected from ForS 201, 202, 203, 204, and 205, (2) 9 hours selected from ForS 214, 260, 261, 265, and 269, (3) the remaining credit hours must be selected in consultation with the advisor from the behavioral sciences, law, management science, or forensic sciences. It is strongly recommended that students participate in the forensic sciences practicum. All candidates are required to pass a written Master's Comprehensive Examination.

Master of Forensic Sciences with a concentration in forensic molecular biology—Prerequisite: a bachelor's degree in the biological or physical sciences from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences. The program of studies consists of 40 credit hours of approved course work. Bioc 221–22, 250, BiSc 429 or ForS 201, BiSc 228, 230, 274, 275, ForS 295, Mict 229, and Stat 127 are required of all students. The remaining required hours are electives chosen in consultation with the advisor. The Bioc 221–22 requirement may be waived if equivalent courses have been taken within the last two years as a part of a graduate degree program. All candidates are required to pass a written Master's Comprehensive Examination.

Master of Science in the field of chemical toxicology—Prerequisite: completion of the first three years of the combined B.S./M.S. program in chemical toxicology (see Chemistry Department) or its equivalent. Courses may be required to remove academic deficiencies.

Required: the general requirements stated under Columbian School of Arts and Sciences. The following courses are required: Bioc 221–22, Phar 203; ForS 240, 245, and 295; two courses selected from ForS 246, 249, 269, ForS 299–300 or Chem 299–300; Chem 141–42, and Stat 127 will be required of students who have not had these courses or equivalent. All candidates are required to pass a Master's Comprehensive Examination.

Five-Year Bachelor of Science/Master of Science in the field of chemical toxicology—See the Undergraduate Programs Bulletin.

Master of Science in Forensic Science—Prerequisite: a bachelor's degree in the biological or physical sciences from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 30 credit hours of course work, plus a thesis (equivalent to 6 credit hours). Individualized programs of study will be developed to meet the career objectives of each student. Students may specialize in forensic chemistry, toxicology, or molecular biology. Each such program of study must include ForS 224–25 and 299–300. The remaining credit hours must be selected from approved courses in the forensic sciences, biological and physical sciences, management science, law, or the medical sciences. It is strongly recommended that students participate in the forensic sciences practicum. All candidates are required to pass a written Master's Comprehensive Examination.

Master of Arts in the field of criminal justice—Prerequisite: a bachelor's degree from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 36 credit hours of approved course work in the forensic sciences, law, criminology, management science, sociology, and psychology. ForS 214, 220, 221, 224, 225, 254, 265, 266, 274, 290, and Soc 259, 261 are recommended. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the forensic sciences practicum.

Master of Arts in the field of criminal justice with a concentration in [illegible] commerce—Prerequisite: a bachelor's degree from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 36 credit hours of approved course work, [illegible] upon the forensic sciences, law, accounting, computer science, investigative techniques, and management. ForS 203, 214, 224, 225, 229, 232, 234, 235, 251, 254, 267, and [illegible] recommended. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the forensic sciences practicum.

Master of Arts in the field of criminal justice with a concentration in [illegible] ment—Prerequisite: a bachelor's degree from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences. Students must complete 36 credit hours of approved course work; students approved for a thesis must complete 30 credit hours of course work plus a thesis (equivalent to 6 credit hours). The program of study consists of course work drawing from the forensic sciences, law, criminology, management science, investigative techniques, and security management. Courses are selected from ForS 214, 224, 225, 229, 232, 234, 252, 254, 255, 256, 257, 290. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the security management practicum.

The interdisciplinary programs leading to the degrees of Master of Arts, Master of Forensic Sciences, and Master of Science in Forensic Science may include course work from the School of Business and Public Management, the Law School, the School of Medicine and Health Sciences, and graduate course work in the behavioral, biological, and physical science departments of the University. Students work closely with their advisors in setting up a program that meets their interests, needs, and background knowledge. The Department of Forensic Sciences is affiliated with the Armed Forces Institute of Pathology, U.S. Secret Service, Naval Criminal Investigative Service, District of Columbia Medical Examiner's Office, and with the Council of Higher Education, Commonwealth of Virginia. In programs of mutual exchange of students, courses, and facilities. For further information, contact the Department of Forensic Sciences.

A research field in forensic chemistry is available in the Ph.D. program in the Chemistry Department.

201 **Forensic Biology** (3)
Lappas, Rowe
Principles of the forensic analysis of blood and other biological materials. Specific procedures and techniques used in forensic biology. Laboratory exercises.

202 **Instrumental Analysis** (3)
Rowe
Principles and application of various instrumental methods to the examination of criminal evidence, including chromatographic and spectrophotometric techniques and mass spectrometry. Laboratory exercises.

203 **Examination of Questioned Documents** (3)
Richards
Theory and principles of handwriting and handprinting, duplicating processes, paper manufacture and fiber analysis, studies of paper and methods of examining questioned documents. Laboratory exercises.

204 **Firearms and Toolmark Identification** (3)
Rowe and Staff
Methods for identifying firearms, cartridge casings, toolmarks, tire marks, and footprints. Laboratory exercises.

205 **Personal Identification** (3)
O'Rear, Rowe
Methods of personal identification based on sketches, fingerprints, voiceprints, odontology, and study of skeletal remains.

214 **Forensic Psychiatry** (3)
Christian, Jackson
Introduction to the constructs of dynamic psychiatry, psychiatric treatment, and the nomenclature of mental disorders. Consideration of expert testimony, direct examination, and cross-examination in hospitalization and criminal cases.

220 **Physical Aspects of Forensic Sciences** (3)
O'Rear, Rowe, Spitzer
Survey of forensic physical sciences; fingerprints, firearm and toolmark examinations, document examinations, and examinations of trace evidence such as glass, soil, paint, hairs, and fibers; crime scene investigations; qualifications and preparation of expert witnesses; operation and functioning of the forensic science laboratory.

221 **Biological Aspects of Forensic Sciences** (3)
Lappas, Rowe
Principles of forensic pathology, biology, and toxicology. The role of the forensic laboratory in the identification of human remains; determination of the time, cause, and manner of death; partial individualization of biological materials; and the detection of drugs in biological materials.

224 **Criminal Law I** (3)
Chaney, Melson, O'Grady, Mount
Principles of criminal law and procedure, preparation and presentation of evidence, examination of witnesses, and methods of legal research.

225 **Criminal Law II: Evidence** (3)
Martin, Chestnut Cribari, Salem
Procedural rules affecting the collection and use of physical evidence. Emphasis on court opinions defining the rules of search and seizure and admissibility of evidence. Prerequisite: ForS 224.

229 **Criminal Law IV: Contracts** (3) Salem
Concepts and principles of law encountered in commercial activities: contracts, sales, negotiable instruments, and bankruptcy. Emphasis on recognition of deceptive contracting practices. Statutes and government regulation governing contracts.

232 **Crime in Commerce I: Accounting** (3) Lorigo
Principles of accounting; abuse and misuse of accounting procedures; use of accounting in the investigation of commercial crime.

234 **Crime in Commerce III: Information Systems** (3) Staff
Principles of management information systems; security of information systems and facilities; compromising of information systems.

235 **Crime in Commerce IV: Conspiracy** (3) Lorigo
Legal definition of conspiracy; quantum of proof, use of investigative techniques to establish the existence of criminal conspiracies.

240 **Principles of Toxicology** (4) Lappas
Concepts of toxicology, including its historical development and modern applications, drug disposition, mechanisms of toxicity, factors that influence toxicity and toxicity evaluation. Prerequisite: Phar 203 or permission of instructor.

245 **Analytical Toxicology** (4) Lappas
A study of qualitative and quantitative principles and procedures used in the detection, identification, isolation, purification, and potency determination of drugs. Laboratory.

246 **Environmental Toxicology** (3) Lappas
A study of the chemical substances to which humans are unintentionally exposed. Emphasis on pesticides, food additives, and air pollutants.

250 **Interdisciplinary Aspects of Forensic Science** (4) O'Rear, Robinson
Scientific and legal aspects of current concepts. Includes qualification as an expert witness, chain of custody, impact of testimony on the jury, admissibility of evidence, class evidence vs. individualized evidence, and search and seizure. Prerequisite: ForS 224.

251 **Moot Court** (3) Martin, Chesnut, O'Grady, Criben
Students prepare and present direct testimony and are cross-examined by an experienced trial attorney in simulated courtroom setting. Class discussions of problems, techniques. Lectures on discovery, admissibility of scientific evidence, chain of custody, use of notes, etc. Prerequisite: ForS 224.

252 **Security Management in Government and Industry** (3) Staff
The broad spectrum of factors that shape modern security management: technology, government regulations and policies, corporate matters, international systems, legal principles, international programs, congressional committees, industrial organizations, associations. Potential areas of research and study.

254 **Selected Topics** (3) Pluchinsky, McLaughlin
Current issues in research, investigation, and law.

256 **Managing Staff Functions in a Security Organization** (3) Staff
Risk assessment and management, redundant security systems, cost-benefit analysis. Administration of personal, industrial, and physical plant security. Analysis of factors that facilitate decision making in security problems.

256 **High-Risk Security: Kidnapping and Hostage Experiences** (3) Staff
Hostage situations, preparation of high-risk employees and spouses for hostage incidents, management of post-incident situations, hostage rescue groups.

257 **Organizational Behavior in the Security Profession** (3) O'Rear, Staff
Theories of management, with emphasis on leadership and interaction of individuals, groups, managers, and the organization as a whole. Discussions centered on organizations with security responsibilities, including government agencies, corporate entities, and the military.

260 **Principles of Forensic Medicine** (3) Staff
Anatomy and physiology of the human body, with emphasis on understanding the processes underlying traumatic and unexpected deaths encountered in forensic pathology. Bone growth and repair as it relates to child abuse. Structure and functions of the heart as related to sudden death, and anatomical areas of the brain prone to hemorrhagic lesions following trauma.

261 **Principles of Forensic Pathology** (3) Staff
Terminology and scientific techniques used in medico-legal investigations of sudden or unexpected deaths, homicides, suicides, accidental deaths, and trauma.

265 **Drugs of Abuse** (3) Lappas, O'Rear
Chemical, pharmacological, toxicological, and pathological characteristics of commonly abused drugs, including ethanol, barbiturates, narcotics, stimulants, and hallucinogens. Primarily for M.A. degree candidates; open to others with permission of instructor.

266 **Seminar: Modern Trends in Criminal Justice** (3) O'Rear, Courtless
Recent advances in criminal justice. Discussions incorporate several disciplines, including science, law, management, social sciences, and psychology.

267 **Seminar: Crime in Commerce** (3) Lorigo
Interdisciplinary course in current problems in the investigation and prosecution of commercial offenses.

268 **Photography in the Forensic Sciences** (3) Ferris, Richards
Basic use of forensic photography, including selection and use of equipment, photographs as evidence, close-up work, and common misconceptions. Laboratory fee, $35.

269 **Forensic Toxicology I** (3) Lappas
Relevant underlying biological, chemical, and pharmacological principles of forensic toxicology. Prerequisite: ForS 270 or permission of instructor.

270 **Medicinal Chemistry** (3) O'Rear, Lappas
Theory and principles of classification, synthesis, and structure activity relationships of drugs. Discussion of the complex chemical events that take place between administration of a drug and its action on the user, with emphasis on drugs of abuse.

271 **Forensic Molecular Biology** (3) Lappas, Rowe
Methods in forensic molecular biology. Laboratory examinations and classifications of dried blood and other biological materials. Independent laboratory projects. Laboratory fee, $35. Prerequisite: ForS 201 or permission of instructor.

272 **Forensic Toxicology II** (3) Lappas
Lectures, student seminars, laboratory exercises, and projects dealing with topics of current interest in forensic toxicology. Prerequisite: ForS 245 or 269 or permission of instructor. Laboratory fee, $35.

273 **Forensic Chemistry I** (3) Rowe
Examination of glass, soils, hairs, and fibers. Laboratory exercises include refractive index measurements using immersion methods, polarized light observations of minerals; x-ray diffraction analysis of minerals, and classical chemical and physical methods of analysis. Prerequisite: ForS 202 or permission of instructor. Laboratory fee, $35.

274 **Management of Criminal Justice Organizations** (3) O'Rear, Lee
Theories of management with emphasis on leadership. Interaction of individuals, groups, managers, and the organization as a whole. Discussions center on the criminal justice system.

280 **Forensic Chemistry II** (3) Rowe
Examination of arson accelerants, textile fibers, plastics and paints. Laboratory exercises include infrared spectrophotometry and pyrolysis—gas-liquid chromatography of polymeric materials, as well as classical chemical and physical methods of analysis. Prerequisite: ForS 273. Laboratory fee, $35.

290 **Major Issues in Criminal Justice Research** (3) Courtless, Lee
An examination of the role and process of research as it serves the criminal justice system. Presentations and discussions of the literature with emphasis on the use of research and analysis in formulating and evaluating criminal justice policy.

295 **Research** (arr.) Staff
Open to qualified master's degree students. Research on problems approved by the department chairman or academic advisor, under the supervision of an appropriate staff member.

296 **Forensic Sciences Practicum** (1) O'Rear
Open to qualified master's degree students. Internship experience in a forensic science laboratory or criminal justice agency, under the supervision of an appropriate staff member. Students must preregister for this course. Credit for the course cannot be used toward the 36 credit hours required for the master's degree.

299–300 **Thesis Research** (3–3) Staff

GENETICS

D.E. Johnson (*Director*), S.L. Adhya, M.W. Allard, V.M. Barnabei, J. Battey, J. Brady, K.M. Brown, D.J. Brusick, P.N. Bryan, T. Cebula, J. Chou, P. Cogen, A. Colburg Poley, N.H. Colburn, D.D. Derse, R. Donaldson, W. Drohan, T. Friedman, R. Friesel, R.C. Gallo, G.L. Gilliland, D. Goldman, G. Hager, C. Holland, B.H. Howard, L.W. Hoyer, V.W. Hu, M. Jamrich, G. Jay, J. Keller, K.A. Kennedy, A. Kumar, J.W. Larsen, P. Latham, W.M. Lee, E. Leighton, R. Mage, R. McKay, K.H. McKenney, C.R. Merril, S. Moody, T.W. Moody, P. Morris, B. Moss, S. O'Brien, S. Patierno, M.H. Polymeropoulos, M. Rose, K.N. Rosenbaum, B. Safer, T. Sargent, J. Schlom, D. Scott, R. Shukla, L.C. Smith, M. Stepp, W.C. Wallace, J. Winkles, E.A. Zimmer

Columbian School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of genetics. The program is directed by a committee whose members are drawn from the Departments of Anatomy and Cell Biology, Biochemistry and Molecular Biology, Biological Sciences, Microbiology and Immunology, Obstetrics and Gynecology, Pathology, and Pharmacology and from government agencies and private industry.

Requirements for admission are stated under Columbian School of Arts and Sciences. The undergraduate program must have included the following: 8 credit hours each in biology, inorganic chemistry, and organic chemistry, and 6 credit hours in physics. Introductory course work in genetics, cell biochemistry, and cell or molecular biology is strongly recommended.

Master of Science in the field of genetics—Required: the general requirements stated under Columbian School of Arts and Sciences. The 30 credit hours required in this program must include Gnet 201 and Gnet 299–300. The remaining 22 credit hours of course work are to be selected with the approval of the Committee on Genetics.

Doctor of Philosophy in the field of genetics—Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study must include the biomedical sciences core curriculum, Gnet 301, 10–12 credit hours of genetics, and 6 credit hours of statistics.

In addition to the courses listed here, the Genetics Program Office maintains a list of approved courses that may apply to its degree programs, including courses drawn from the biological sciences, statistics, public health, and the departments and programs within the biomedical sciences.

201 Advanced Problems in Genetics (2)
Lectures on selected topics by members of the Committee on Genetics. Required of all master's degree candidates in the Genetics Program. Prerequisite: degree candidacy or permission of program director. (Fall)

256 Molecular Genetics of Inherited Diseases (2)
Biochemical aspects of genetics and contributions of molecular biology to understanding of human mutations and hereditary diseases. Prerequisite: degree candidacy or permission of program director. (Spring)

260 Molecular Genetics of Proteins (3)
Laboratory techniques in gel electrophoresis and electroelution, high pressure liquid chromatography, protein blotting, proteolytic and chemical cleavage of proteins, amino acid analysis, automated Edman degradations, peptide synthesis and computer-assisted analysis of protein structure. (Fall, even years)

295 Research (arr.)
Open to qualified master's degree students. Research on problems approved by the Committee on Genetics. May be repeated for credit. (Fall and spring)

299–300 Thesis Research (3–3)

301 Advanced Problems in Genetics (2)
Lectures on selected topics by members of the Committee on Genetics. Required of all Ph.D. candidates in the Genetics Program. Limited to students enrolled in the Genetics Program unless special permission is obtained from the director. (Fall)

398 Advanced Reading and Research (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 Dissertation Research (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

GEOBIOLOGY

Committee on Geobiology
A. Brooks (*Acting Chair*), R. Hanger, R.E. Knowlton, D.L. Lipscomb, H. Merchant, B. Wood, R. Bernor

Columbian School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of geobiology. The program is directed by a committee whose members are drawn from the Departments of Anthropology, Biological Sciences, Geography, and Geology. It is enhanced by cooperative relationships with the Smithsonian Institution and the U.S. Geological Survey. Students may elect to specialize in paleoanthropology within the general program framework of evolutionary biology, paleoecology, and paleontology.

A bachelor's degree in anthropology, biology, botany, geography, geology, or zoology from this University, or an equivalent degree from another accredited institution of higher learning, is required for admission to the program. Prerequisite course work in invertebrate zoology or comparative vertebrate anatomy or human anatomy, organic evolution or nonmind evolution, general ecology, historical geology, invertebrate or vertebrate paleontology or primatology, statistical methods, and genetics. GW courses that correspond to these prerequisites are, respectively, BiSc 130 or 132 or Anth 146, BiSc 150 or Anth 147, BiSc 154, Geol 2, Geol 151 or 154 or Anth 148, Stat 91, and BiSc 107. Listings of courses at the 100 level are to be found in the Undergraduate Programs Bulletin.

Master of Science in the field of geobiology—Required: the general requirements stated under Columbian School of Arts and Sciences. The program includes 30 credit hours of course work, plus a thesis (equivalent to 6 credit hours). Required courses include BiSc 210, Geol 254 and 255, and two field courses in different disciplines. Electives are selected in consultation with the committee from a list of relevant courses in anatomy, anthropology, biological sciences, geology, and geography.

Doctor of Philosophy in the field of geobiology—Required: the general requirements stated under Columbian School of Arts and Sciences. The program includes 48 credit hours of course work, plus a dissertation (equivalent to 24 credit hours). Required courses include BiSc 208 and 210, Geol 254, 255, and 263, and two field courses in different disciplines. Electives are to be selected as for the master's degree (to total, with the required courses, at least 48 credit hours).

Research fields. Any subdiscipline of anthropology, biology, geography, or geology that pertains to research in ecology and evolution.

295 **Research** (arr.)
Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit.

298–300 **Thesis Research** (3–3)

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

GEOGRAPHY

Professors D.C. McGrath (*Chair*), J.C. Lowe
Professorial Lecturers B. Thomas, G.T. Foggin, P. Mobley, E. Bruner
Associate Professor M.D. Price
Assistant Professors A. Viterito, D. Fuller

Master of Arts in the field of geography—Prerequisite: a bachelor's degree with a major in geography or in a related field in the social or natural sciences.

Required: the general requirements stated under Columbian School of Arts and Sciences. Course work must include Geog 105 (*Techniques of Spatial Analysis*).

Thesis and nonthesis options are available. The thesis option requires a minimum of 30 credit hours of course work, including Thesis Research; the nonthesis option requires a minimum of 36 credit hours of graduate work. All degree candidates must take a Master's Comprehensive Examination that covers the substance of academic work pursued in the program of study.

Students entering the program without a bachelor's degree with a major in geography may be required to take prerequisite courses as determined by the department. All enter-

ing students must have completed one course, or its equivalent, from each of the following groups: physical/resource geography (Geog 108, 132, 135); population/cultural/political geography (Geog 127, 145, 146); urban/economic geography (Geog 125, 140, 141).

Depending upon the chosen field of specialization, each student will select electives from appropriate courses within the department or from related programs and departments within the University or the Consortium of Universities. The student's program of study will be developed in consultation with the advisor and graduate committee.

Master of Science and *Doctor of Philosophy in the field of geobiology*: see Geobiology.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

201 **Planning Theory and Practice** (3) McGrath
Introduction to the development of urbanization and urban settlements in the United States, the emergence and growth of urban and regional planning, and the evolution of issues in the practice of the planning profession.

207 **Land Development Planning** (3) McGrath
Selected problems in urban and regional planning; applications of zoning, environmental controls, tax incentives, and other techniques available for the implementation of development plans.

208 **Land Use and Urban Transportation Planning** (3) McGrath
Relationships between land use and the movement of goods and people. Examination of land use and transportation planning principles, issues, and techniques. Roles of public and private interests in land use and transportation planning and management.

213 **Mesoamerican Field Program** (3 or 6) Staff
Same as AmSt/Anth 213. (Summer)

219 **Seminar: Climatology** (3) Staff
Atmospheric circulation systems, controls, and distribution. Elements of synoptic climatology, including climate modeling.

220 **Seminar: Climatic Change** (3) Staff
Climatic history; examination of natural and induced climatic change.

222 **Seminar: Resources and the Environment** (3) Staff
Analysis of the spatial variations and interrelationships of resources and the environment, using geographic information systems. Prerequisite: permission of instructor. Laboratory fee, $30.

223 **Seminar: The Population–Food Balance** (3) Staff
Spatial problems associated with the dynamics and interaction of population growth and agricultural output.

224 **Seminar: Political Geography** (3) Staff
Examination of the political factor in location theory and analysis of the nature of political territories.

225 **Seminar: Transportation and Development** (3) Staff
Transportation and communication in the organization of space.

230 **Seminar: Environmental Issues in Development** (3) Staff
A consideration of the differential regional implications of and responses to resource and environmental policy decisions due to regional differences in societal and physical parameters.

243 **Seminar: Urban Geography** (3) Staff
Evolving morphology and internal spatial patterns of cities.

244 **Seminar: Urban Systems and Development** (3) Staff
Central place theory and other theories of urban location and the organization of systems of cities.

250 **Regional Development** (3) Staff
Geographic perspectives on theory, planning, and programmatic aspects of regional development, with case studies.

261 **Geographical Perspectives on Latin America** (3) Staff
Political and economic factors in a development context, emphasis on urban and human resources and environmental and land use issues.

265 **Seminar: Geography of the Former Soviet Union** (3) Staff
Survey of the regions and major topical themes of the geography of the former Soviet Union, including population, energy, agriculture, transportation, and regional development.

266 **Seminar: Geographic Perspectives on Contemporary China** (3) Staff
China's development prospects: environmental constraints, population growth, and regional differences in the context of Chinese cultural patterns and political organization.

290 **Principles of Demography** (3) Boulier
Same as Econ/Soc/Stat 290.

291 **Methods of Demographic Analysis** (3) Boulier
Same as Econ/Soc/Stat 291.

295 **Research** (arr.) Staff
May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

GEOLOGY

Professors F.R. Siegel, J.F. Lewis, G.C. Stephens (*Chair*)
Adjunct Professor W. Back
Professorial Lecturer I.H. Kravitz
Associate Professor R.P. Tollo
Associate Professorial Lecturer M.J. Baedecker
Assistant Professors W.S. Logan, A.V. Logan (*Research*), R.A. Hanger (*Visiting*), C.M. Fedo
Assistant Professorial Lecturers R. Seal, M.K. Brett-Surman, R.A. Avuso
Lecturer R.T. Rye

Master of Science in the field of geology—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science with a major in geology.

Required: the general requirements stated under Columbian School of Arts and Sciences. Course work must include Geol 240 and 272. Candidates are required to pass a Master's Examination.

Both thesis and nonthesis options are available. Under the thesis option, a minimum of 30 credit hours of course work is required, including Geol 299–300; candidates must pass the Master's Examination before completing their thesis work. Under the nonthesis option, a minimum of 36 credit hours of course work is required; course work must include the courses above and Geol 128, 189, 219, 274, and 295. Two electives should be chosen from Geol 216 or 263, 211 or 224, 241 or 243, and 254 or 257 or 266.

Master of Science in the field of geochemistry (an interdepartmental degree offered by the Departments of Geology and Chemistry)—Prerequisite: a bachelor's degree with a major in geology or in chemistry and, at a minimum, introductory courses in the other field.

Required: the general requirements stated under Columbian School of Arts and Sciences, including Chem 111–12, Geol 240, 241 or 243, 249, Chem 213 or other upper-level chemistry course approved by the advisor, and Geol 299–300. Geol 105, 111, 112, 124, 138, and 151 may not be taken for graduate credit. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. Stat 129 or another course approved by the advisor must be passed.

Master of Science and Doctor of Philosophy in the field of geobiology—see Geobiology.

Doctor of Philosophy in the field of geology—Required: the general requirements stated under Columbian School of Arts and Sciences and the satisfactory completion of the General Examination in three fields, one of which must be in petrology, stratigraphy, or structural geology.

Research fields: geochemistry, hydrogeology, mineralogy, paleontology, petrology, sedimentology, stratigraphy, and structural geology.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs section for course listings.

211 **Advanced Mineralogy** (3) Tollo
Review of the lattice structure, crystal chemistry, and phase relations of rock-forming minerals. Application of mineralogic data to solution of geologic problems is emphasized. Prerequisite: Geol 111, 112 (or equivalent), or permission of the instructor. (Spring, even years)

216 **Sedimentary Petrogenesis** (3) Fedo
Origin and evolution of clastic sediments from a geochemical and petrographic perspective. Emphasis on a quantitative treatment of major elements, trace ele-

ments and rare earth elements to extract provenance and weathering information. Prerequisite: Geol 117, 118, 166. Laboratory fee, $30. (Fall, odd years) Lewis

219 **Petrogenesis** (3)
The origin of selected igneous and metamorphic rock types. Prerequisite: Geol 117, 118, or permission of instructor. Laboratory fee, $25. (Fall) Stephens

224 **Advanced Structural Geology** (3)
Study of problems in structural analysis and tectonics. Prerequisite: Geol 122 (Spring, odd years) Siegel

240 **Principles of Geochemistry** (3)
Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisite or concurrent registration: Geol 117 or equivalent; Chem 11–12; Math 31; Phys 1 or 3; or permission of instructor. Laboratory fee, $30. (Fall) Siegel

241 **Marine Geochemistry** (3)
Chemical composition and physical properties of sea water, chemical composition and alterations of marine sediments, thermodynamics and biochemical activity in oceans. Methods of analysis and problems of measuring. Prerequisite: Geol 240 or permission of instructor. Recommended: Chem 22. Laboratory fee, $25. (Spring, odd years) Siegel

243 **Applied Geochemistry** (3)
Application of geochemical principles and analyses to the detection of mineral and energy resources and to the understanding and alleviation of environmental problems based on the chemistry of earth materials. Field trips as arranged. Prerequisite: Geol 240. Laboratory fee, $25. (Spring, even years) Staff

249 **Seminar: Geochemistry** (2)
Independent topics each semester; may be repeated for credit. Hanger

254 **Evolutionary Paleobiology** (3)
Analysis of special topics in macroevolution—paleobiogeography, speciation, taphonomy, evolutionary paleoecology, and rates of evolution. Hanger

255 **Quantitative Paleoecology** (3)
Application of univariate and multivariate statistical techniques to solve problems of paleoecology and taphonomy. Uses in other geological and ecological disciplines. Prerequisite: Geol 151, Stat 91; or permission of instructor (Spring, odd years) Fedo

263 **Sedimentary Environments** (3)
Study of selected depositional environments. Field trips as arranged. Prerequisite: Geol 261. Laboratory fee (field trips), $30. (Spring, odd years) Fedo

266 **Tectonics and Basin Analysis** (3)
Treatment of sedimentology and stratigraphic packaging in basins set in different tectonic settings, collisional margin basins, tensional and strike slip basins, continental margin basins and sequence stratigraphy. Prerequisite: Geol 122, 126 (Fall, even years) Fedo

272 **Regional Geology of the Appalachians** (3)
Integrated analysis of the structural, stratigraphic, and tectonic evolution of the Appalachian orogenic belt through time. Critical evaluation of recent advances and comparisons with other deformed areas of North America and elsewhere. Required field trips provide opportunities to examine key exposures throughout the Appalachian region. (Spring, odd years) Engel

274 **Physical Hydrogeology** (3)
The occurrence, storage, movement, quality, and problems of pollution of surface water and the hydrologic properties of water-bearing materials. Prerequisite: Geol 1 or 5; Math 31; or permission of instructor. (Fall) Engel

275 **Geochemistry of Groundwater** (3)
Application of geochemical principles to the interpretation and prediction of groundwater activity in regional systems, carbonate and silicate equilibria, weathering and redox reactions, isotopes, and contaminated aquifers. Prerequisite: Geol 274 or CE 219 or permission of instructor (Spring, even years) Engel

276 **Advanced Groundwater: Modeling** (3)
Application of numerical models to solving groundwater supply and contamination problems. Model design, boundary conditions, sources-sinks, calibration and strengths and limitations of models. Prerequisite: Geol 274 or CE 219 or permission of instructor. A knowledge of a programming language is desirable. (Spring, odd years)

295 **Research** (arr.) Staff
Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

HISTORY

Professors H.M. Sachar, L.G. DePauw, R. Thornton, P.F. Klarén, R.E. Kennedy, Jr., W.H. Becker, L.P. Ribuffo, E. Berkowitz, R.H. Spector (*Chair*), J.O. Horton, H.F. Gilbette, Jr., L.L. Peck, H. Hudson (*Research*), M.E. Saperstein
Associate Professors C.J. Herber, R.A. Hadley, A.D. Andrews, M.A. Atkin, R.B. Stott, H.L. Agnew, E.A. McCord, C.E. Harrison, D.R. Khoury, T. Anbinder
Adjunct Associate Professor K. Bowling
Assistant Professors A.L. Alexander, D. Yang, J. Hershberg, S. McHale
Director and Principal Investigator of the First Federal Congress Project C. Bickford

Master of Arts in the field of history—Prerequisite: a bachelor's degree from an accredited college or university with a major in history, or with substantial course work in history of high academic quality, high scholastic standing, and approval of the department. Required: the general requirements stated under Columbian School of Arts and Sciences; and reading knowledge of one foreign language. A thesis program consists of a minimum of 30 credit hours of 100- and 200-level courses, including Hist 299–300 Thesis Research, and at least three other 200-level courses. A non-thesis program consists of a minimum of 36 credit hours of 100- and 200-level courses, including at least six 200-level courses, two of which must be research seminars. (See the Undergraduate Programs Bulletin for a list of 200-level courses offered by the department.) Exceptions to the minimum for 200-level courses can be granted only by the department's Graduate Programs Committee. Hist 264 is required of candidates who have not previously had a course in historiography and historical method. A maximum of 6 credit hours may be in approved courses outside the History Department. To receive graduate credit for 100-level courses, master's candidates must arrange for extra work with the instructors. Each student is required to pass a Comprehensive Examination in one of the major fields listed under Doctor of Philosophy in the field of history, below.

Master of Arts in the field of history with a concentration in historic preservation—Required: the general requirements stated under Columbian School of Arts and Sciences. This 36-hour master's degree program combines courses in United States history and historic preservation. It includes at least 18 hours of U.S. social history, U.S. urban history, Afro-American history, modern America, and the seminar sequence in historic preservation. For other course distribution requirements, see the departmental graduate advisor. Candidates in this program may also be required to pass an examination in measured architectural drawing.

Master of Arts in the field of history with a concentration in public policy—Required: the general requirements stated under Columbian School of Arts and Sciences. This 36-hour program emphasizes the study of history as it relates to the analysis and conduct of public policy. Hist 213 and an internship are required. Additional course work is to be chosen with advisor's approval.

Doctor of Philosophy in the field of history—Required: the general requirements stated under Columbian School of Arts and Sciences, including the passing of a written examination in two appropriate foreign languages or in one foreign language and an approved specialty (such as statistics or oral history), and the satisfactory completion of the General Examination in four fields.

Candidates in American history must select two major fields from early America (to 1815), nineteenth-century America (1815–1900), and twentieth-century America (1900–). Their two minor fields will normally be topical (e.g., U.S. social, U.S. diplomatic, historic preservation). Candidates in Asian history must select two major fields from modern China, modern Japan, and modern Southeast Asia. Their two minor fields will be chosen in consultation with their graduate committees. Major field exams are five hours in length; minor field exams, four hours.

Candidates concentrating in areas other than American and Asian history must select one major and three minor fields. Major fields are early modern Europe, modern Europe, Latin America, modern Middle East, modern Eastern Europe, modern Russia, and military history. Their three minor fields may be either topical (e.g., European intellectual or chronological (e.g., Tudor and Stuart England, colonial Latin America). Major field exams are six hours; minor field exams, four hours.

All candidates may choose to be examined in one minor field other than history if it is relevant to the program of study. Students having a minor field in historical preservation may be required to pass an examination in measured architectural drawing.

Doctor of Philosophy in the field of American religious history (offered in cooperation with the Department of Religion)—Required: the general requirements stated under Columbian School of Arts and Sciences and the specific requirements of the Doctor of Philosophy in the field of history, stated above. The General Examination must cover four fields, including two from the Department of History (generally American social history and one other) and two from the Department of Religion (history of religion in America and one other field in religious history).

201 History and Historians (3) Stott
Historiography and historical method for graduate students. Readings and discussions on major trends in history; selections from classics of historical literature. Students who receive credit for Hist 201 cannot receive credit for Hist 195. (Spring)

203–4 Seminar: Research or Readings (3–3) Staff
Offered on demand for individual research programs. Prerequisite: approval of department. (Academic year)

205–6 Seminar: Eastern European History (3–3) Agnew
Hist 205: 1772–1918; Hist 206: 1919–1945. (Academic year)

209 Readings/Research Seminar: Topics in Ancient History (4) Hadley
Readings on general topics in the history of the ancient Near East, Greece, or Rome. Topics to be announced in the *Schedule of Classes*. Students with working knowledge of the appropriate language(s) may receive research credit.

214 Seminar: History and Public Policy (3) Berkowitz
Seminar in the use of historical insights and methods in policymaking, with emphasis on domestic issues. Assessment and use of primary sources for policy analysis and the use of historical analogy in policy formulation.

217 Seminar: Russian and Soviet Thought (3) Atkin
Selected topics in the intellectual and cultural history of 19th- and 20th-century Russia and Soviet Union. May be taken as a readings seminar or, with instructor's approval, as a research seminar. Admission by permission of instructor. (Spring)

218 Readings/Research Seminar: Soviet Nationalities (3) Atkin
An examination of the relationship between the USSR's multinational composition and its domestic political, economic, social, and cultural policies and foreign relations. May be taken as a readings seminar or, with instructor's approval, as a research seminar. Admission by permission of instructor. (Spring)

219 Internship in History and Public Policy (3 or 6) Berkowitz
Supervised participation in an office or agency concerned with the formulation of public policy; terms of the internship are arranged with the director of the History and Public Policy Program. Enrollment restricted to students in the History and Public Policy Program. (Fall and spring)

220 American Business History (3) Becker
The history of American business institutions in manufacturing, distribution, transportation, and finance. Particular attention will be given to the period since industrialization, with consideration of business institutions in their economic, legal, governmental, and social contexts. Same as SMPP 293. (Spring)

224 Readings/Research Seminar: European Intellectual History (3) Kennedy
Topics in 18th- and 19th-century European thought, with an emphasis on France. Specific topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. (Odd years)

225 History of Washington, D.C. (3)
Same as AmSt 225

228 **Topics in Modern Military and Naval History** (3) Spector
Discussion, readings, and research in 20th-century European and American military and naval history.

229 **Seminar: World War II** (3) Spector
Examination of statecraft and the management of force before, during, and after World War II. Special attention to broad aspects of military policy and strategy and their interaction with international politics and diplomacy.

230 **Readings/Research Seminar: Strategy and Policy** (3) Spector
A study of the historical development of strategy and the relationship of military thought to national policy.

233 **The Age of the Battleship: An Introduction to Modern Naval History** (3) Spector
The rich and varied literature of naval history, with emphasis on interactions among technology, nationalism, and domestic political/social developments in the late 19th and early 20th century. The social history of navies is included. (Spring)

237 **Seminar: Soviet Foreign Policy, 1917–1964** (3) Staff
Concepts and perceptions guiding Soviet relations with the outside world. From the blockade and intervention, through years of isolation, World War II, the Cold War, to "peaceful coexistence."

239 **Seminar: Early Modern European History** (3) Staff
Topics selected from Western European history of the 14th through 17th centuries.

241 **Readings/Research Seminar: Modern European History** (3) Herber
Prerequisite: appropriate preparation and consent of instructor.

246 **Readings/Research Seminar: History of Modern Russia and the Soviet Union** (3) Atkin
Selected topics in the domestic history of modern Russia and Soviet Union. May be taken as a readings seminar or, with instructor's approval, as a research seminar. Admission by permission of instructor. (Fall)

249 **Research Seminar: European Diplomatic History** (4) Herber
Research seminar in individually selected topics concerning the foreign policies, actions, and interrelations of the European great powers and their statesmen in the 19th or 20th century. Reading knowledge of one language other than English required. (Fall)

250 **History of International Systems** (3) Khoury
A team-taught world history course designed to acquaint graduate students with varieties of global and imperial political and economic systems that preceded and co-exist with the current global order.

251 **Seminar: English People and Institutions** (3) Peck
Selected topics in the political, social, intellectual, and economic history of England. Focus upon one time period and special area of interest. May be taken for research credit with instructor's approval. (Fall and spring)

253–54 **Seminar: History of Sino-Soviet Relations** (3–3) Thornton
Readings seminar designed to develop analytic and historiographic skills. Fall: turn of the century to the Korean War; spring: from the foundation of the People's Republic to the collapse of the Soviet Union and its consequences. (Alternate academic years)

255–56 **Seminar: U.S.–Soviet Strategic Relations Since World War II** (3-3) Thornton
Readings seminar designed to develop a conceptual framework for understanding contemporary U.S.–Soviet relations. Fall: World War II through the Johnson administration; spring: the administrations of Nixon, Carter, and Reagan. (Academic year)

259–60 **Research Seminar: Problems in U.S.–Soviet–Chinese Relations** (3–3) Thornton
Development of scholarly skills through preparation of a research paper. Prerequisite: Hist 254 or 255 or permission of instructor. (Alternate academic years)

261–62 **Readings/Research Seminar: Topics in Modern Latin America** (3-3) Klaren
Admission by permission of the instructor.

267 **Seminar: American Social Thought Since World War II** (3) Ribuffo
Consideration of C. Wright Mills, Daniel Bell, Abraham Maslow, Christopher Lasch, Paul Goodman, Martin Luther King, Jr., Barbara Ehrenreich, and other major social critics. (Fall)

270 **Theory and Practice of Public History** (3) Horton
Same as AmSt 270.

271–72 **Readings/Research Seminar: U.S. Social History** (3–3) Horton
Hist 271: Readings seminar on American daily life, institutions, and intellectual and artistic achievements. Hist 272: Research seminar. Hist 271 is prerequisite to Hist 272.

275–76 **Readings/Research Seminar: Early American History** (3–3) DePauw
Readings in the fall, research in the spring. Admission by permission of instructor. (Alternate academic years)

277–78 **Historic Preservation: Principles and Methods** (3–3) Longstreth
Same as AmSt 277–78.

282 **History of U.S. Foreign Policy, 1898–1980** (3) Staff
Readings, lectures, discussion on major developments in the conduct of American diplomacy. (Fall and spring)

283–84 **Readings/Research Seminar: Recent U.S. History** (3–3) Ribuffo
Prerequisite: 6 credit hours of 100-level American history courses. Research and readings, depending on students' interests and curricular needs.

285–86 **Readings/Research Seminar: Women in War** (3–3) DePauw
Readings in the fall, research in the spring. Admission by permission of instructor. (Alternate academic years)

289 **Seminar: Modern Japanese History** (3) Yang
Selected topics in modern Japanese history from the Meiji Restoration of 1868 to the present. Research or readings depending on students' interests and curricular needs. (Spring)

291 **Readings/Research Seminar: 20th-Century History** (3) Sachar
Research or readings on selected topics. (Fall)

292 **Readings/Research Seminar: Israel, Zionism, and the Arab World** (3) Sachar

293 **Research Seminar: Modern East Asian History** (3) McCord, Yang, Khan

294 **Research Seminar: The Modern Middle East** (3)
Readings, discussion, and research in selected political, economic, social, cultural, and intellectual trends. (Spring) McCord

295 **Readings Seminar: Late Imperial China** (3)
Selected topics in the history of modern China in the late imperial period, with a particular focus on the internal and external challenges to the last Chinese dynasty in the 19th century. (Fall) McCord

296 **Readings Seminar: 20th-Century China** (3)
Selected topics in the history of modern China from the 1911 Revolution to the Cultural Revolution. (Spring) Staff

297 **Special Topics Seminar** (3)
Open to doctoral and master's candidates and qualified undergraduates. May be repeated for credit. Offered whenever five or more students can be enrolled. Staff

299–300 **Thesis Research** (3–3) Staff

301–2 **Folger Institute Seminars** (3–3)
Topics will be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. Consult the chair of the department before registration. Staff

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Staff

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit

HUMAN RESOURCE DEVELOPMENT

See **Counseling/Human and Organizational Studies.**

HUMAN SCIENCES

Committee on the Human Sciences
A. Hiltebeitel (*Director*), I. Azar, P.J. Caws, J.J. Cohen, R. Grinker, J.C. Kuipers, M. McAlister, J.A. Plotz, L.B. Salamon, M.S. Soltan, J.-F. Thibault, I.R. Vergara, G. Weiss

Columbian School of Arts and Sciences offers an interdisciplinary program leading to the degree of Doctor of Philosophy in the field of human sciences. The program is administered by a committee whose members are drawn from cooperating departments and programs, which include American Studies, Anthropology, Art, English, History, Philosophy, Psychology, Religion, Romance Languages, Sociology, and Women's Studies.

The program in the human sciences is part of the growing interdisciplinary trend that employs methods and principles common to the humanities and social sciences for examination of culture and meaning. Toward that end, students pursue inquiry in six core areas: archaeology of the human sciences; contemporary theory; language, meaning, and interpretation; historical issues in the human sciences; culture and society; techniques of critical reading. In addition, each student pursues a specialization in one of the cooperating departments or in an area approved by the program.

General requirements for the degree are stated under Columbian School of Arts and Sciences. A Bachelor of Arts with a major in one of the cooperating disciplines or a related discipline is required for admission.

The program of study must include the following: (1) 72 credit hours of course work (48 hours for students with master's degrees in related disciplines), which may include up to 24 hours of dissertation research. (2) One designated core course in each of the core areas. (3) Demonstrated proficiency in two foreign languages. (4) A Qualifying Examination following completion of 18 credit hours, with satisfactory performance necessary for continued enrollment in the program. (5) A General Examination that covers the core requirements and the student's chosen concentration. (6) A satisfactory interdisciplinary dissertation.

In addition to core courses, students pursue graduate course work for which they are qualified in any of the cooperating departments. Prior to preregistration in each semester, lists of applicable courses are posted and circulated.

201 The Idea of the Human Sciences (3)
The origins and development of theories that have attempted to account for human meaning, understanding, and creativity, and the critical, rhetorical, and interpretative tools their exponents have employed, from the Presocratics to postmodernism.

202 Contemporary Theory in the Human Sciences (3)
Critical examination of major theoretical strategies employed by current practitioners of the Human Sciences. Topics may include structuralism, hermeneutics, deconstruction, semiotics, and feminist history.

203 Language, Meaning, and Interpretation (3)
Theories of meaning, truth, reference, understanding, communication, and speech-acts. May be cross-listed with Anth 203.

204 Historical Issues in the Human Sciences (3)
Theoretical examination of human history and the nature of historical knowledge. Topics may include historical materialism and idealism, eschatology, the idea of progress, positivism, and national mythologies.

205 Culture and Society (3)
Critical examination of cultural practices and social institutions from an interpretive perspective. Selected readings in cultural theory and cultural studies.

206 Techniques of Critical Reading (3)
Critical reading of one or more texts, utilizing the theoretical strategies of the human sciences. For purposes of this course, texts may include any human artifacts or constructions that are invested with meaning.

295 Directed Reading and Research (3)
Supervised reading in selected fields within the human sciences. May be repeated once for credit.

297 Special Topics in Human Sciences (3)
Open to master's and doctoral students. May be repeated for credit provided the topic differs.

310 Advanced Seminar in Human Sciences (3)
Advanced topics, theories, and methods in different fields of the human sciences. Limited to doctoral candidates preparing to do their dissertation. May be repeated for credit provided the topic differs. Staff

398 Advanced Reading and Research (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Staff

399 Dissertation Research (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

INTERNATIONAL AFFAIRS

University Professor J.N. Rosenau
Professors W.H. Becker, E. Berkowitz, B.L. Boulier, M.D. Bradley, J. Chaves, J.J. Cordes, R.M. Dunn, Jr., M.A. East, F. Ghadar, D. Gow, H. Harding, J. Henig, M.A. Holman, N.F. Kennedy, Jr., Y. Kim, Y.K. Kim-Renaud, P.F. Klarén, R.M. Krulfeld, J.E. Kwoka, Jr., M.C. LaFollette (*Research*), P. Lauter, C.A. Linden, J.M. Logsdon, J.C. Lowe, G. Ludlow, **Manheim, C. McClintock, C. Menges** (*Practice*), J. Millar, **H.R. Nau, R.D.F. Pease** (*Practice*), J. Pelzman, J.M. Post (*Practice*), P. Reddaway, B. **Reich, L.P. Ribuffo,** E.N. Sachar, D. Shambaugh, S.C. Smith, M. Sodaro, R.H. **Spector, R.** Steinhardt, L.F. Thibault, R. Thornton, M. Whyte, S. Wolchik, A.M. Yezer
Adjunct Professors **R. Butterworth, T.F. Carroll, K.S. Flamm, J. Hardt**
Professorial Lecturers **E.G. Griffin, J. Urban**
Associate Professors H.L. Agnew, C.J. Allen, M.A. Atkin, A. Bowie, N.J. **Brown, C.J.** Deering, C.F. Elliott, H.B. Feigenbaum, R. Grinker, C.J. Herber, D. Khoury, J. Kuipers, J.H. Lebovic, D.L. Lee, S. Livingston, E.A. McCord, B.D. Miller, M.O. Moore, V. Olkhovsky, M. Price, R. Robin, F. Robles, R. Rodriguez-Garcia, R.W. Rycroft, S. Suranovic, **N.S. Vonortas, G.C.Y. Wang**
Assistant Professors D. Auerswald, D. Avent, B.J. Dickson, M. Finnemore, **J. Goldgeier,** D. Hart, J. Hershberg, S. Jain, S. McHale, S. Reeves, S. Rehman, P. Rollberg, S. Sell, **Wilnat, L. Xue, D. Yang, A.Y. Zhao**

The Elliott School of International Affairs offers a multidisciplinary program leading to the degree of Master of Arts in the field of international affairs. The program provides students with a broad background in the general areas of international affairs as well as opportunities to specialize in one of the traditional disciplines or in a regional area.

Master of Arts in the field of international affairs—This multidisciplinary program offers a framework that prepares students for professional positions in a broad range of international careers. As outlined more specifically below, students complete a core field of courses from the Departments of Economics, Political Science, and History, a four-course major field, and a capstone policy project. At least 6 hours of elective courses are chosen.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School of International Affairs. All degree candidates must take a minimum of 36 credit hours of course work and may take no more than 21 hours in one department. Students may write a thesis if they meet requirements stated under The Thesis in the Elliott School section of this Bulletin. Thesis candidates may take no more than 15 hours of course work in any one department.

Core field—The core field consists of Hist 250, PSc 240, and either Econ 280 or Econ 284 and 285. After consultation with and approval of the relevant department and the dean, students with sufficient academic background may waive any of these core courses.

Major field—The major field consists of four courses taken in at least two academic departments. The major fields include International security studies, international economic affairs, development and international affairs, international public health, technology and international affairs, international law and organizations, U.S. foreign policy, East Asia, Latin America, Middle East, Europe, Western Europe, Central Eastern Europe, Russia/Commonwealth of Independent States. Note that students who choose a regional major field are required to take PSc 230. Program guidelines available from the Elliott School list specific courses that pertain to these major fields. A student may petition the dean to design a special major field.

The academic program must include 3 credit hours of IAff 201 courses. Specific offerings of these skills and special topics workshops are listed in the *Schedule of Classes*.

Reading and oral proficiency in a modern foreign language must be demonstrated during the final 18 hours in residence. Up to 6 hours of foreign language credit may be

counted toward the degree. With approval of the dean, advanced proficiency in statistics may be substituted, provided that the student's professional goals or research interests justify the substitution.

All degree candidates participate in a policy project administered by the Elliott School each spring semester. Students may sign up to participate if they have completed or are registered for 30 of the program's required 36 credits. Those pursuing the thesis option may participate at 24 of the required 30 credits.

Consult program guidelines available from the Elliott School for more details about program requirements.

The following courses carry the International Affairs (IAff) designation. All other courses listed above will be found under the appropriate department designation.

201 Skills and Special Topics Workshop (1 or 2)
Courses designed to focus on developing skills and specialized knowledge for international affairs professions. Topics announced in the *Schedule of Classes*.

203 MIPP Seminar and Practicum (3)
For Master of International Policy and Practice candidates only.

204 Theory and Practice of International Negotiations (3)
An examination of the bargaining process in international diplomacy and other international negotiations and mediation. Theoretical approaches to explain negotiation are explored with a case study approach. Same as PPsy 204.

206 International Affairs Capstone Project (0)
Open only to graduating M.A. candidates in international affairs.

207 East Asian Capstone Project (0)
Open only to graduating M.A. candidates in East Asian studies.

208 ITIP Capstone Project (0)
Open only to graduating M.A. candidates in international trade and investment policy.

209 SPS Capstone Project (1)
Open only to graduating M.A. candidates in security policy studies.

211–12 Multidisciplinary Seminar in Development (3–3) Gow, Miller-Smith
Assessment of economic, political, social, technological, and environmental factors as they interact to affect development, with emphasis on individual human capabilities, and capabilities of indigenously initiated or administered economic and social organizations. For degree candidates in international development studies only. (Academic year)

220 Science, Technology, and Public Policy (3) Logsdon, Ryvcroft, Vonortas
Introduction to the study of science, technology, and public policy, focus on policy issues that arise from interactions between scientific and technological developments and government activity. (Fall)

221 Technology Creation and Diffusion (3) Vonortas
Examination of the relationship between invention (inception), innovation (first application), and dissemination (diffusion) of technological knowledge. Focus on the technological environment currently prevailing in the major developed market economies with historical references. (Fall)

222 Science, Politics, and International Culture (3) LaFollette
An exploration of the various linkages between science, technology, and culture and how those linkages reflect broader cultural patterns in determining policy toward science and technology. (Spring)

223 U.S. Space Policy (3) Logsdon
Investigation of the origins, evolution, current status, and future prospects of U.S. national space policy and the space programs of the U.S. government in their international context. (Fall)

224 Issues in U.S. Space Policy (3) Logsdon
A seminar designed to undertake in-depth analysis of a current space policy issue. Team research format involving preparation of a comprehensive assessment of that issue and policy recommendations regarding its resolution. (Spring)

225 Environmental Policy (3) Ryvcroft
A seminar examining public policy designed to protect the human and physical environment. Focus on the ways science and technology simultaneously create new environmental problems and contribute to their mitigation and prevention. (Spring)

229 **Multidisciplinary Seminar in Science, Technology, and Global Affairs** (3) Logsdon, Ryerson, Vonortas
A combination of a lecture series and a workshop on an ongoing science and technology issue. Focus on a cross-disciplinary policy concern. For degree candidates in science, technology, and public policy only. Prerequisite: IAff 220 (Spring) Staff

253 **Defense Policy and Program Analysis I** (3)
Examination of how national security policy is formulated and translated into a defense budget, program priorities, and force structure. Focus on general purpose forces. (Fall and spring) Staff

254 **Defense Policy and Program Analysis II** (3)
Analysis of development of national security policy and the use of analytic techniques to derive a defense program and force structure from it. Special attention to general purpose forces. (Spring) Butterworth

255 **Applied Quantitative Techniques** (3)
The application of quantitative techniques in the solution of issues in defense policy. (Spring)

287 **Problems in Latin American Civilization** (3) Klarén and Associated Faculty
Interdisciplinary capstone seminar; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor (Spring) Staff

290 **Special Topics in International Affairs** (3)
Courses designed to focus on international affairs issues of a more current or topical nature. Topics announced in the *Schedule of Classes*. Staff

291 **Colloquium: East Asia** (3)
Colloquium for advanced students of East Asian affairs. Admission by permission of the instructor Staff

292 **Colloquium: Russia and Eastern Europe** (3)
An advanced seminar on political and economic developments since the 1980s with focus on the current period. Guest lectures on current research and analysis by visiting scholars and practitioners. (Spring) Staff

293 **Colloquium: National Defense Policies and Issues** (3)
Colloquium for advanced students of security policy studies. Admission by permission of the instructor Staff

295 **Colloquium: Europe** (3)
Survey of current research on Europe. Research paper required. Required of M.A. candidates in European studies; open to others with permission of the instructor. (Fall)

296 **Seminar/Internship: United Nations and Related Organizations** (3)
For selected M.A. candidates in the Elliott School. The course includes seminar meetings, an internship at a U.N. agency or related organization, and a research paper. Staff

298 **Independent Study and Research** (1 to 3)
Limited to M.A. degree candidates. Written permission of instructor required. Staff

299–300 **Thesis Research** (3–3)

INTERNATIONAL BUSINESS

Professors G.P. Lauter (*Chair*), Y.S. Park, H.G. Askari
Professorial Lecturers D.A. Peterson, N. Bruck, R. Scaldini
Associate Professors F. Robles, R. Weiner
Assistant Professors M.L. Egan, S.S. Rehman, D.M. Sanford, Jr., J. Yang, H.J. Pongratz, R.W. Click, L.B. Schumacher

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy.

260 **The New Global Competitive Framework** (3) Lauter, Rehman, Egan, Sanford
How industries develop sustained competitive advantages within the global framework. The European Union's "single market" and the European Monetary Union; the transformation of formerly centrally planned economies; the changing Japanese economy and emerging Pacific Basin; with implications for the U.S. economy, industries, and firms. (Fall and spring)

261 **Multinational Corporations in the World Economy (3)** Sanford, Egan
Business in a competitive world economy; multinational corporations as economic, political, and social institutions; ownership and growth strategies; national and international controls; functional aspects of international business operations; future of the multinational corporation. (Fall and spring)

263 **Legal Aspects of International and Multinational Business** (3) Peterson
Legal environment of international and multinational business including legal systems, antitrust laws, regulation of direct investment, international arbitration and expropriation; topics of current interest. (Fall and spring)

264 **International Business Strategy** (3) Click
Discussion of the changing nature of the international environment and the resulting impact on strategy of both U.S. and foreign multinational corporations. Various aspects of strategy are considered, including marketing, production, and financial strategy. The focus of discussion is at the company level.

266 **International Marketing** (3) Robles, Egan
Organizational structures. Analysis of international markets. Market-entry strategies and product policies. Special issues. Channels of distribution, promotional and price policies. Prerequisite: MBAd 240. (Fall and spring)

267 **Regional International Marketing Systems** (3) Robles
Discussion of the business, economic, political, legal, and social environments of Latin America, Asia, the Middle East, and China, as they affect the marketing of goods and services in these regions. Identification of business opportunities and risks in these areas. (Fall and spring)

269 **Managing in Developing Countries** (3) Egan
The course introduces managers to the distinctive nature and challenges of developing countries, provides a framework to analyze key management issues, and applies management techniques in these important markets.

271 **International Business Finance** (3) Park, Rehman, Weaver, Yang, Askari, Click, Schumacher
Analysis of major issues and developments in international business financial management and their impact on multinational corporations and financial institutions. Prerequisite: MBAd 250. (Fall and spring)

273 **Seminar: International Banking** (3) Park, Yang, Schumacher
International financial intermediation and international banking. Functioning of international financial markets, public policy issues in international banking, regulation of international banking institutions, and the effect of international banks on national monetary policies. (Fall and spring)

275 **External Development Financing** (3) Brueck
Policies, institutions, instruments, and theory of external development financing; financial flows to developing countries; the role of international, regional, and national development banks, the World Bank and IMF; technical cooperation, institution building, training, and financial markets for developing countries. (Fall and spring)

276 **Seminar: International Financial Markets** (3) Park, Askari, Weaver
Survey of international financial markets, focusing on structure and pricing. Primary emphasis on markets for foreign exchange, Eurocurrency, international bonds, and commodities. Derivatives markets, especially swaps and options. Prerequisite: IBus 271, Fina 220. (Fall and spring)

277 **International Portfolio Management** (3) Weaver
Theory and practice of international investment. Portfolio construction and optimization. Effects of exchange rate changes on portfolio risk and return. International asset pricing models and trading institutions. Prerequisite: Fina 220, IBus 271.

278 **International Business Negotiations** (3) Teegen
Theories and application in International Business Negotiations (IBN). Examination of concepts and frameworks; development of systematic approaches to planning for and conducting IBN. Integration of functional, environmental and international contexts facing negotiators internationally. Prerequisite: IBus 240. (Fall and spring)

280 **Special Topics** (3) Staff
Experimental offering, new course topics and teaching methods. May be repeated once for credit.

298 **Directed Readings and Research (3)** Staff
Supervised readings or research in selected fields within business administration. Admission by prior permission of instructor. May be repeated once for credit. (Fall and spring)

299 **Thesis Seminar (3)** Staff

300 **Thesis Research (3)** Staff

311 **Seminar: Public–Private Sector Institutions and Relationships (3)** Staff
Same as SMPP 311.

361 **Colloquium on International Business (3)** Staff
Examination of selected topics in international business, with emphasis on major new theoretical and empirical developments. (Fall)

398 **Advanced Reading and Research (arr.)** Staff
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

399 **Dissertation Research (arr.)** Staff
Limited to doctoral candidates. May be repeated for credit.

INTERNATIONAL DEVELOPMENT STUDIES

Program Committee: D. Gow (*Director*), B. Dickson, M.L. Egan, S. Jain, B. Miller, P. Moore, M. Price, R. Rodriguez-Garcia, S.C. Smith

Master of Arts in the field of international development studies—The Elliott School of International Affairs offers a multidisciplinary program leading to the Master of Arts in the field of international development studies. The program provides students with a background both in international development and in a disciplinary concentration.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a field related to the disciplinary concentration as listed below.

Required: the general requirements stated under the Elliott School of International Affairs. The program offers a 30-credit hour option with a thesis or a 36-credit hour option without a thesis. Students qualify to write a thesis if they meet requirements stated under The Thesis in the Elliott School section of this Bulletin. All students must take the multidisciplinary development core, IAff 211–12, which serve as cornerstone and capstone courses, respectively. IAff 212 includes a capstone policy project.

Students select one disciplinary concentration from among the following: anthropology, economics, geography, international business, international education, international health, political science, and sociology. Students should consult the program guidelines available from the Elliott School for specific course work in the disciplinary concentration. Three credits of IAff 201 may be counted toward the degree.

All students must demonstrate oral and reading proficiency in a modern foreign language. Students may apply up to 6 hours of language course credit toward the degree for the analytical field. Students choose PPol 211, PAd 296, or equivalent; Econ 247; and a course in research methods relevant to the disciplinary concentration.

INTERNATIONAL TRADE AND INVESTMENT POLICY

Program Committee: M. Moore (*Director*), W. Becker, J. Pelzman, S. Rehman, S. Surinovic, S. Sell

The Elliott School of International Affairs offers a multidisciplinary program leading to the Master of Arts in the field of international trade and investment policy. The program provides a strong background in economics and quantitative methods, a multidisciplinary approach to international economics issues, and preparation for careers in government, the private sector, and nonprofit organizations.

Prerequisite: the admissions requirements stated under the Elliott School of International Affairs. Applicants are strongly advised to take an introductory statistics course and an intermediate macroeconomics and macroeconomics sequence before beginning the program.

Required: the general requirements stated under the Elliott School of International Affairs. The program offers a 30-credit hour option with a thesis or a 36-credit hour option without a thesis. Students qualify to write a thesis if they meet requirements stated under The Thesis in the Elliott School section of this Bulletin.

The student must complete a core field consisting of Econ 203–04, PSc 230, 1 course specified by the program director, and a quantitative methods course chosen from Econ 123, PPol 211, PAd 296, Stat 105, 112, 118, 183. A four-course major field is selected

from among the following: international economic analysis, international marketing, international banking and finance, or comparative economic policy. The student should consult the program guidelines available from the Elliott School for the specific courses included in these major fields. Three credits of IAff 201 may be counted toward the degree.

Oral and reading proficiency in a modern foreign language must be demonstrated during the final 18 hours in residence; up to 6 hours of language course credit may be counted toward the degree. A capstone policy project, offered each spring semester, must be successfully passed.

LATIN AMERICAN STUDIES

Program Committee: C. McClintock (*Director*), C.J. Allen, P.F. Klaren, M. Price, J. Quiroga

Master of Arts in the field of Latin American studies—The Elliott School of International Affairs offers a multidisciplinary program leading to the Master of Arts in the field of Latin American studies.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School of International Affairs.

The program consists of 36 credit hours of course work. The five-course core includes a multidisciplinary foundation course approved by the program director, IAff 287 as the capstone course that includes the policy project, and three courses on Latin America chosen from designated courses in anthropology, economics, geography, history, and political science. The four-course major field is taken in anthropology and geography, art history, literature, and culture, economics and international business, international health and development, and political science and history. Students should consult program guidelines available from the Elliott School for specific courses in the fields of study.

All students must demonstrate oral and reading proficiency in Spanish or Portuguese by passing a language examination during the final 18 hours in residence. Up to 6 hours of language course credit may count toward the degree. Three credits of IAff 201 may also apply to the degree.

Students who meet stated requirements may choose to take 30 hours of course work plus 6 hours of thesis research. See The Thesis under the Elliott School section of this Bulletin.

LEGISLATIVE AFFAIRS

Academic Director D.W. Johnson

Columbian School of Arts and Sciences offers a program leading to the degree of Master of Arts in the field of legislative affairs. This program focuses on the U.S. Congress with emphasis on the legislative process, American political institutions, and public policy analysis.

Master of Arts in the field of legislative affairs—Prerequisite: a bachelor's degree with a B average from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences. The nonthesis program consists of 33 credit hours of course work; the thesis program consists of 27 hours of course work and 6 of thesis (PSc 299–300). PSc 201 or 203, 215, 222, and 229 are required. The remaining courses are chosen from the following, with at least two courses taken in each of the two groups:

American Political Process: PSc 215, 216, 219, 220, 221, 226, 228, 234, 246, 286

Public Policy Analysis: PSc 212, 224, 225, 249, 250; WSto 240

With prior approval of the academic advisor, students may take courses in related disciplines. All students must pass a Master's Comprehensive Examination.

MANAGEMENT SCIENCE

Professors I.B. Harvey, W.F. Halal, E.H. Forman, S.A. Umpleby, I.F. Lobuts, Jr., I.D. Frame, E.F. Wrasslow (*Chair*), I.H. Carson, P.W. Wirtz, J. Liebowitz, E.J. Cherian, S.N. Sherman, H. Peary, P.K. Bagchi, J.P. Coyne, R. Soyer

Professorial Lecturers E. Marits, G.T. Solomon, J.L. Wild

Associate Professors L.E. Graff, T.J. Nagy, R.G. Donnelly, C.N. Toftoy, P.M. Swiercz, D.J. Sanchez, W.H. Money, D.L. Zalkind, M.J. Granger, J. Artz

Assistant Associate Professors L. Williams, C.K. Carlson

Associate Professorial Lecturer C.A. Gruel
Assistant Professors Z. Covalu, S.Y. Prasad, L.M. Birou, P. McHugh, E.G. Caravannis, C. Goldberg (*Visiting*), S. Sarker
Adjunct Assistant Professor S. Lippert
Adjunct Instructor X.Y. Dai

See the School of Business and Public Management for programs of study leading to the degrees of Master of Business Administration, Master of Science in Information Systems, Master of Science in Project Management, and Doctor of Philosophy.

201 **Organization and Management** (3) Halal, Money
Integrative approach to organizational concepts, management principles, philosophy, and theory in public and private organizations. Evolution of management, thought, functions, and practices, stressing present management approaches, general systems theory, and contingency management. For non-M.B.A. students only. (Fall, spring, and summer)

202 **Mathematics and Statistics for Management** (3) Sanchez, Wirtz, Prasad
Mathematical and statistical concepts employed in the solution of management problems. Applications of functions, elements of calculus, and linear algebra. Introduction to probability, frequency distributions, statistical inference, and regression and correlation. For non-M.B.A. students only. (Fall, spring, and summer)

206 **Strategic Planning** (3) Halal
Formulation of strategies that enable organizations to adapt to changing social, technological, economic, and political conditions. Lectures, discussion, and exercises examine strategic planning practices and the environmental changes affecting corporations, government agencies, hospitals, and other major institutions. Students conduct a strategic planning project for an organization. (Fall)

207 **Applied Forecasting and Time-Series Analysis for Managers** (3) Soyer, Sanchez
Introduction to various forecasting techniques, including time-series regression models, cyclical trends, exponential smoothing methods, seasonal and nonseasonal ARIMA processes, and the Box–Jenkins approach. Application of forecasting methods in economics, finance, and marketing. Prerequisite: MBAd 220 or permission of instructor. (Spring)

210 **Individual and Group Dynamics in Organizations** (3) Harvey, Winslow, Lobuts
For graduate students who wish to improve their skills in dealing with human behavior in organizations. The course is designed to improve theoretical and personal understanding of the roles of interpersonal and group dynamics in management. Focus on individual and group behavior in various organizational settings. (Fall, spring, and summer)

211 **Current Issues in Organizational Behavior** (3) Winslow, Lobuts
Study of behavioral factors relating to issues such as automation, ethics, interpersonal relations, organizational change, and similar problems in organizational settings. Problems of conducting behavioral science research in organizations. (Fall)

212 **Behavioral Factors in the Process of Change** (3) Harvey, Winslow
Review of research, theory, and practice related to the process of human change. Students are provided the opportunity to apply their learning, using various media. This course emphasizes the relationship between theory and practice. (Fall, spring, and summer)

213 **Organization Development: The Process of Organizational Change** (3) Lobuts, Marits, Wirtz
A review of the process and practices of organization development. An experiential course leading to the development of practitioner skills for the manager, leader, or organizational administrator. Emphasis is on systematic, planned organizational interventions by the manager, although the roles of other change agents are explored. (Fall)

214 **Behavioral Factors in Management Consulting** (3) Harvey, Lobuts, Winslow
Theories and methods of planning, introducing, and coping with change in management through the helping process. Intended both for managers seeking an understanding of the consultative approach to planned change and for

sons in staff or consultative roles seeking understanding of the consultative process. (Spring)

215 **Conflict Management: Theory, Concepts, and Methods** (3) Lobuts, Harvey, Winslow
Exploration of various approaches to the causes of conflict and its resolution. Students study and experience ways to make conflict a creative rather than a destructive experience. Methods of conflict resolution are practiced. Conflict is explored at the micro (person-to-person) and macro (system-to-system) levels. Prerequisite: Mgt 210 or permission of instructor. (Fall and spring)

216 **Cross-Cultural Management** (3) Lobuts, Umpleby, Winslow
This course focuses on the variety of issues and opportunities that arise when managing outside one's own culture. The manager's credibility and effectiveness are assumed to be culture bound. Emphasis on the personal level as opposed to the interinstitutional or intercultural levels. Extensive use of student experiences and research. (Fall, spring, and summer)

220 **Analytical Models for Decision Making** (3) Forman, Sanchez, Soyer, Covaliu, Prasad
Survey of analytical models for decision making and their applications. Topics include probabilistic, deterministic, and sequential models, single- and multi-attribute utility theory, graphical models, Bayesian inference, forecasting, and concepts from game theory. Prerequisite: MBAd 220 and 231. (Fall and spring)

221 **Purchasing and Materials Management** (3) Birou, Sherman, Bagchi
Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, supplier qualifications, source selection, buying practices, policies, and ethics. International purchasing. (Fall and spring)

222 **Logistics Management** (3) Bagchi, Perry, Sherman
Management of work in production, commercial, service, and public organizations. Analytical tools for planning and establishing operating systems and for their operation, control, and modification. Examination of processes, products, services, equipment, and facilities. Relationships of human systems and operating systems. (Fall)

223 **Manufacturing Control Systems** (3) Bagchi, Perry
Inventory and production control concepts, techniques, and strategies for effective integration with basic finance, marketing, and manufacturing objectives. Forecasting methods, material requirements planning systems, distribution requirements planning techniques, process control, and classical reorder-point inventory models. (Fall)

224 **Executive Decision Making** (3) Forman, Sanchez, Soyer, Covaliu
Concepts and methods for making complex decisions in both business and government; identifying criteria and alternatives, setting priorities, allocating resources, strategic planning, resolving conflict, and making group decisions. (Fall and spring)

225 **Statistical Modeling and Analysis** (3) Wirtz, Forman, Soyer, Sanchez
The process of specifying, analyzing, and testing models of human and systemic behavior. Formalization of models; statistical test comparison and selection; computer implementation of univariate, bivariate, and multivariate tests. General linear model, linear regression, analysis of variance, and analysis of covariance. Prerequisite: MBAd 220 or equivalent. (Fall and spring)

226 **Workshop in Computerized Decision Systems** (3) Forman, Prasad, Zalkind
Framework, processes, and technical components for building decision support systems dealing with unstructured and underspecified problems from managerial and organizational perspectives. Construction and exploration of decision support system models. Prerequisite: Mgt 220 or permission of instructor. (Spring)

227 **Advanced Logistics** (3) Bagchi
Transportation and communications services management; optimization of cost and service. Alternatives available to the manager, given the economic situation, competitive conditions, and regulatory environment of the several transportation modes. Model location theory and distribution network planning and design. Prerequisite: Mgt 222. (Spring)

228 **Operations Strategy** (3) Bagchi, Perry
Basic production methods and techniques that influence formulation of a firm's strategic policy. Traditional and updated and improved systems for controlling capacity and output. Examination of productivity analysis, cost control, materials planning, and other topics to ensure that the production/operations function contributes to overall profit. (Spring)

229 **Seminar: Management Decision Making** (3) Forman, Sanchez, Soyer, Covalin, Prasad
Advanced topics in management decision making. Topics vary but usually include Bayesian statistics and decision analysis, graphical models, strategic decision making, and business applications of game theory. Prerequisite: Mgt 223 or 224, or permission of instructor. (Spring)

230 **Management of Technology Innovation** (3) Donnelly
Competitive, economic, and political factors that influence technology innovation in public and private organizations, domestically and internationally. Management of research and development: project selection, resource allocation, technology planning, management of development projects. Quality, manufacturing, and intellectual property issues. (Fall and spring)

231 **Project Management** (3) Frame, Wells, Williams
Practical examination of how projects can be managed from start to finish, including specific emphasis on planning and controlling to avoid common pitfalls. Identifying needs, defining requirements, project costing, scheduling, resource allocation, and project politics. Configuration management, manual and computer applications. (Fall, spring, and summer)

232 **International Science and Technology** (3) Frame, Carayannis
Technology transfer among advanced countries and LDCs. Comparative science and technology policies and capabilities of countries. Technology basis for international trade, licensing, patenting, and joint ventures. Global transfer of military technologies and export controls. Technology in economic development. (Fall, spring, and summer)

233 **Emerging Technologies** (3) Halal, Frame
Exploration of new developments in scientific and technological innovation, including automation, energy, medicine, bioengineering, social science, information technology, and space. Emphasis on forecasting these technological advances and assessing their economic and social effects. The role of advancing technology in driving social change. (Spring)

234 **Procurement and Contracting** (3) Sherman
Principles and concepts essential to effecting large procurement programs. Planning, sourcing, and contractual design for diverse acquisitions. Emphasis on federal government policy with comparison of buying at other governmental levels and the private sector. (Spring)

235 **Technology Entrepreneurship and Innovation** (3) Donnelly, Frame
The process of innovation and entrepreneurship used to launch and build new ventures. Organizing for innovation, raising venture capital, tax considerations, managing the small technology-based venture, marketing technology, case studies of recent low- to high-tech ventures. Developing a business plan for a technology-based venture. (Spring and summer)

236 **Government Contract Administration** (3) Sherman
Surveillance and management of contract performance. Measurement of progress; specification interpretation; quality assurance; changes, negotiation, and adjustment; financial considerations; property, terminations, regulatory and policy concerns. (Spring)

237 **Pricing and Negotiation** (3) Sherman
Scope and objectives of negotiated procurement; preparation, conduct, and recording of negotiations; analysis of cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. (Fall)

238 **Systems Procurement and Project Management** (3) Perry, Sherman
Major systems acquisition needs, objectives, organizational relationships, and systems engineering concepts. Design, establishment, and execution of program management plans and procurement processes. Analysis of cases in public and private-sector contracting. (Fall)

239 **Seminar: Competitiveness and Technology** (3) Donnelly
Capstone course integrating the field of management of science, technology, and innovation. Commercialization of technology in the private sector and the impact on competitiveness. Implementation of technology in the public sector. Technology development, from new product concept to utilization.

240 **Case Studies in Information Systems** (3) Liebowitz, Artz
Case studies dealing with information systems management and technology. Strategic and management-related issues on information systems development, implementation, and application. Prerequisite: MBAd 221. (Fall and spring)

241 **Information Security Systems** (3) Cherian
An advanced course in information technology, emphasizing the philosophies, principles, and practices of security management in and impact of privacy legislation on computer-based systems. Risk assessment, state-of-the-art measures, trends in the information security field, and roles of the various levels of management and technological staff. Prerequisite: M.S.I.S. candidacy.

242 **Systems Analysis for Information Systems** (3) Carson, Liebowitz, Coyne, Artz, Gruel
Development of a specification for an information system. Topics include CASE tools, data gathering, information flow modeling, object-oriented analysis, data file organization, input/output and other nonfunctional requirements, such as performance reliability, environmental conditions, and training. (Fall and spring)

243 **Human Factors in Information Systems** (3) Nagy, Coyne
The user–computer interaction, human factors of on-line dialogues, interfacing, and various approaches to user–system interaction. Emphasis on the development and evaluation of user–computer interfaces using software such as Visual BASIC and Windows. (Fall and spring)

244 **Telecommunications: Technology, Applications, and Operations** (3) Carson, Artz
Basic technical concepts, applications, and trends of telecommunications; operations; cost considerations of implementing telecommunications systems. (Spring)

245 **Database Management for Information Systems** (3) Artz, Granger, Coyne
Theory, architecture, and implementation of database management systems in corporate and organization information systems. Designing databases for business applications and implementing such databases using commercially available packages. (Fall and spring)

246 **Applied Expert Systems** (3) Nagy, Liebowitz
Students build an expert system that performs monitoring, diagnosis, classification, scheduling, planning, etc., and tolerates incomplete or inexact inputs. (Fall and spring)

249 **Seminar in Hypermedia Information Systems** (3) Coyne, Graff
Current trends in the design and implementation of hypermedia information systems. Integration of database, text, image, voice, video, and knowledge in information systems. (Fall and spring)

250 **Human Resource Management** (3) Cohen, Swierez
Human resource practices in a competitive U.S. economy and in an internationally competitive environment, including labor–management relations. (Fall, spring, and summer)

251 **Total Compensation** (3) McHugh
Comprehensive review of all elements of adaptive compensation systems that affect an organization, including wages and salaries, incentives, benefits, perquisites, and intrinsic rewards. (Fall)

252 **Global Human Resource Management** (3) Cohen
International applications of human resource management functions. Selection, preparation, and compensation of U.S. managers and executives for service abroad. Adaptation of human resource management policies to conform to specific cultural environments. (Fall and summer)

253 **Leadership and Executive Development** (3) Cohen
Theories of managerial leadership; issues and problems associated with leadership in large organizations at higher management levels; executive selection and development. (Fall)

254 **Labor–Management Relations and Negotiations** (3) McHugh, Swierc
Labor–management relations in both union and nonunion settings. Emphasis on negotiation and conflict resolution, arbitration and grievance procedures, public-sector labor relations, labor laws and public policy, and global labor relations issues. (Fall)

257 **Performance Management and Development** (3) Cohen
Comprehensive review of performance appraisal and training and development. Students learn to develop customized training programs that relate to the performance appraisal process. (Spring)

258 **Applied Organizational Leadership** (3) Mc
In-depth studies of theories of leadership. Legal and ethical obligations of ership. The leader in the process of assuming responsibility. Experiential exercises designed to develop the students' interpersonal abilities and leadership capacities. (Spring)

259 **Employment Law and Ethics** (3) Swierez, McHu
An examination of the interaction of legal requirements and personal ethics and their influence on managerial decisions affecting the employment exchange. Special emphasis on equal employment opportunity and civil rights, wrongful discharge. (Fall)

261 **Introduction to Systems Theory and Cybernetics** (3) Umpleby
The course provides a general theory of the regulation of systems and a theory of information processing and decision making that can be applied to machines, human beings, groups, corporations, or nations. Ways of conceptualizing systems, strategies for regulating systems, and problems that arise in self regulation. (Fall)

262 **Interactive Planning and the Viable System Model** (3) Umpleby
A competitive organization must both solve day-to-day problems and periodically restructure itself to meet new challenges and opportunities. The course reviews several strategies for conducting a planning process. Organizational designs that have led to improvements in performance are presented. (Spring) Umpleby

264 **System Dynamics Modeling** (3)
Computer modeling of organizational problems using system dynamics and the dynamo programming language. Review of previous applications of system dynamics and comparison with other modeling approaches. Causal influence diagrams, level and rate diagrams, equations, testing, and analysis. Students develop a system dynamics model of some aspect of the organization. Frame, Money, W

267 **Scheduling and Cost Control** (3)
Analysis of various management techniques for developing budgets, schedules and human and material resource allocations; life-cycle cost estimating; integrated cost and schedule control; configuration management; integrated planning and analysis tools. Prerequisite: Accy 201, Mgt 202, MBAd 224 (Fall, spring, and summer)

268 **Project Management Applications** (3) Frame, Money, Patton, W
Capstone course. Application of theory to selection and management of projects, using software simulation packages and information technologies. Risk and software selection criteria, risk and quality management, multimedia communication techniques, and use of current intelligent technologies. Prerequisite: M.S.P.M. candidacy or permission of instructor. (Fall and spring) Money, W

269 **Program Management Applications** (3)
Capstone course. Case studies may include the F-16 aircraft program, the Shuttle Challenger disaster, and various World Bank development efforts. Software packages, information technologies, multi-media communications techniques, and current intelligent technologies. Prerequisite: M.S.P.M. candidacy or permission of instructor. (Fall and spring) Patton, Money, W

270 **Special Topics Workshop** (1)
Students design and carry out a work plan for studying specific aspects of project or program management of interest to them. Work performed independently with occasional class meetings to share results and report progress. Prerequisite: M.S.P.M. candidacy. (Fall, spring and summer) Cherian, M

271 **Principles of Management Information Systems** (3)
Integration of management, information, and systems concepts into a framework. Management information systems development, design, implementation and evaluation strategies. Prerequisite: M.S.I.S.T. candidacy

272 **Information Resources Management** (3) Cherian, Williams
An overview of the use of information by organizations and the strategies, policies, and technology used to manage information resources and security. Computer networking and national and international telecommunications are examined within the technical, legal, economic, and social environments of systems operations. Prerequisite: M.S.I.S.T. candidacy.

275 **Advanced Statistical Modeling and Analysis** (3) Wirtz
Advanced topics associated with the general linear model. Testing for and remediation of assumption violations. Detection of outliers, influential observations, and multicollinearity. Alternative design strategies in the analysis of variance, latent growth analysis, hierarchical linear modeling, testing for interactions and parallelism. Prerequisite: Mgt 225 or permission of instructor.

276 **Exploratory and Multivariate Data Analysis** (3) Wirtz
Methods for exploratory and multivariate data analysis. Application and comparison of advanced multivariate analytical procedures. Multivariate and discriminant analysis, LISREL analysis, and canonical correlation. Prerequisite: Mgt 225 or permission of instructor. (Fall)

278 **Knowledge Acquisition** (3) Liebowitz, Nagy
Knowledge acquisition is often the biggest problem in expert systems development. The ability to acquire knowledge from the expert requires both technical and interpersonal skills. This course is aimed at explaining some of the barriers to acquiring knowledge and discusses techniques to overcome them.

279 **Special Topics in Neural Networks** (3) Coyne, Liebowitz, Nagy, Artz
This course covers the fundamental concepts of neural networks and the use of this technology for a variety of business applications. Students develop neural network applications using commercial neural network software. The relationship between neural networks and expert systems. Prerequisite: permission of instructor.

280 **Information Systems Development and Applications** (3) Carson, Coyne
Each stage of the information systems life cycle is discussed in terms of technologies, impact, and management. Topics include structured and object-oriented analysis, prototyping,software reuse, testing, life-cycle costs, software development environments, organizational and behavioral aspects of development projects. Prerequisite: M.S.I.S.T. candidacy or department approval.

281 **Virtual Reality for Business Applications** (3) Coyne, Carson
Introduction to virtual reality and 3-D data visualization, with emphasis on business applications. Fundamental concepts, equipment, and capabilities, and the use of VR as an integrative mechanism for other intelligent technologies.

282 **Telecommunication and Enterprise Networks** (3) Carson, Artz, Prasad
Telecommunications and networking as applied to enterprises in the commercial and public sector. A survey of the technologies and applications of telecommunications systems with emphasis on LANs. Selection of technologies and configurations necessary to support business applications. Prerequisite: M.S.I.S.T. candidacy and department approval.

283 **Topics in Higher-Level Languages** (3) Carson, Artz
The structure and organization of high-level languages in relation to the systems development process. Object-oriented design and programming using the JAVA programming language. Programming assignments demonstrate the concepts presented. Prerequisite: M.S.I.S.T. candidacy and department approval.

284 **Database Systems** (3) Coyne
Use of the latest techniques for developing and implementing an effective database system. Topics include database organization, creation, and maintenance, evaluation criteria, standardization of database systems, and analysis of the state of the art in database development. Prerequisite: M.S.I.S.T. candidacy and department approval.

285 **Database and Intelligent Systems** (3) Coyne
Analysis and solution of complex information problems through commercially available database and intelligent systems, development of evaluation methodology, comparison of implementation strategies. Hands-on experience with major commercial systems. Prerequisite: M.S.I.S.T. candidacy, Mgt 284 or department approval.

286 **Comparative Operating Systems (3)** Artz, Carson
Survey of modern operating systems including Unix, MS-DOS, Windows 95 and NT, OS/2, and MVS. Process management, memory management, storage

management, scheduling, and security are considered theoretically and as implemented in specific operating systems. Emerging object-oriented operating systems. Prerequisite: M.S.I.S.T. candidacy and department approval.

287 **Design of On-Line Information Systems** (3) Carson, Mercer
Analysis, design, and implementation of on-line information systems. Topics include systems analysis, database design, dialog design, response time and reliability calculations, system testing, and project planning. Prerequisite: M.S.I.S.T. candidacy and department approval.

288 **Artificial Intelligence and Intelligent Systems** (3) Nagy, Liebowitz
Use of programming methods and knowledge representations originating in artificial intelligence (e.g., executable specifications, rules, frames, objects, neural networks) to develop systems. Prerequisite: M.S.I.S.T. candidacy and department approval.

290 **Special Topics** (3) Staff
Experimental offering; new course topics and teaching methods. May be repeated once for credit.

291 **Entrepreneurship** (3) Winslow, Solomon
In exploring the "entrepreneur as a phenomenon," students will be exposed to the theory and experiences associated with entrepreneurs, entrepreneurial activity, and entrepreneurship in all organizational settings—large, small, public, and private. (Fall and spring)

292 **Small-Business Management** (3) Toftoy, Winslow
The start-up process and management of small firms. Field projects in which student teams as consultants to local businesses. Case studies. Emphasis on customer service, international opportunities, and minority and women's issues.

293 **New Venture Initiation** (3) Toftoy, Carayannis
Essentials of planning a new business venture, sources of financing, evaluation of alternative new business ventures, and analysis of business functions. Creating and analyzing the business plan.

298 **Directed Readings and Research** (3) Staff

299 **Thesis Seminar** (3) Staff

300 **Thesis Research** (3) Staff

311 **Seminar: Public–Private Sector Institutions and Relationships** (3) Staff
Same as SMPP 311.

328 **Special Topics in Decision Making** (3) Markowitz
Special topics and advanced applications, such as catastrophe theory, Markovian decision processes, and Bayesian statistics. May be repeated once for credit.

329 **Seminar: Materials and Operations Management** (3) Bagchi, Perry, Sheu
Recent developments in manufacturing production and materials management. Impact of technological economic and social change; significant related issues. Private- and public-sector policy implications. New and emerging analysis techniques. Open only to doctoral students.

340 **Philosophical Issues in Information Systems** (3) Various phil.
Seminar for doctoral students interested in information systems. Various philosophical traditions and insights from those traditions applied to problems in information systems. (Spring) Liebowitz

341 **Advanced Topics in MIS Research** (3) Liebowitz, Leading
For information systems doctoral students. Seminal IS papers and leading methods and instruments as applied to MIS research. (Fall)

382 **Seminar: Historical Foundations of Organizational Behavior and Development** (3) Harvey, Lobuts, Winslow
The individuals and institutions central to the field of organizational behavior and development. Students read about, meet with, and discuss the work of persons central to the development of the field. Prerequisite: Doctoral candidate status with organizational behavior and development as a major or support field, or consent of instructor. (Spring, alternate years)

385 **Special Topics in Research Methods** (3) Wing, Staff
Research problems and issues related to student dissertations; lectures, readings, group discussions, and assigned papers. (Fall and spring) Harvey, Lobuts, Winslow

386 **Seminar: Organizational Behavior and Development Ideas in Progress** (3)
Doctoral students work with a variety of faculty members as they develop ideas, research projects, and engage in seminal inquiry. The content and

ture of the course will depend upon the instructor. Prerequisite: Doctoral candidate status with organizational behavior and development as a major or supporting field, or consent of instructor

390 **Philosophical Foundations of Administrative Research** (3) Staff
Philosophy of science as applied to research in administration. Topics include the nature and current problems of epistemology, the development and role of theories, and the relationship between theory, methodology, and empirical data. (Fall and spring)

391 **Advanced Problems in Research Methodology** (3) Wirtz, Maritz
Use of models and theoretical frameworks in research, formulation of research questions, hypotheses, operational definitions, research designs, sampling and data analysis approaches. For doctoral candidates who have completed the general examination and all courses and are preparing for their dissertation. (Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to doctoral candidates. May be repeated for credit.

MARKETING

Professors S.F. Divita, R.F. Dyer, P.A. Rau (*Chair*), R.S. Achrol
Associate Professors M.L. Liebrenz-Himes, L.M. Maddox, S.S. Hassan
Assistant Professor A.K. Smith
Adjunct Assistant Professor C.B. Jacobina

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy.

Departmental prerequisite: MBAd 230 is prerequisite for all courses in the Marketing Department except Mktg 255.

241 **Advanced Marketing Management** (3) Divita, Liebrenz-Himes, Rau
For M.B.A. students in concentrations other than marketing. Case analysis of marketing problems. Current developments in marketing practice. The relationship of marketing to environmental forces and other business functions. (Spring)

242 **Buyer Behavior** (3) Dyer, Hassan, Maddox
A required course for marketing students. The buyer decision process model as a framework for analysis of how and why products and services are purchased and used. The impact of consumer decisions on the marketing strategies of organizations. Marketing applications in high-tech and service industries.

243 **Marketing Research** (3) Dyer, Rau
The marketing research process: designing, conducting, and using market research studies. Managing the market research project: qualitative research, survey and experimental designs; data analysis with statistical software packages. Prerequisite: MBAd 220 and 221. (Fall and summer)

246 **Marketing of Services** (3) Liebrenz-Himes
Management of the activities involved in marketing new and existing services. The innovation system (behavioral and organizational) of service product decisions, product planning processes, marketing auditing, services and the law, and new service trends. Marketing of intangibles and services is highlighted. (Spring)

248 **Advertising and Sales Promotion** (3) Maddox
Examination of advertising and sales promotion from a systems perspective supported by analytical methods and concepts regarding consumer attitudes and behavior. The role of communication in marketing. Behavioral research, message design, economic and financial criteria, development of a promotion program. (Spring)

250 **Selling and Sales Management** (3) Divita
The selling task with attention to ethical and legal issues, the selling process, account management, negotiation. Managerial issues, demand analysis and

resource allocation, financial planning, quota setting and control, motivation, coaching and incentives, sales administration, and analysis of sales performance. (Fall and spring) Achrol

253 **Marketing Channels** (3)
Marketing channels as super-organizations: planning, organization, coordination, and control. The channel's task environment: manufacturing, wholesaling, retailing, and physical distribution institutions. System performance and management of interorganizational relationships among channel institutions. (Fall and summer) Divita

255 **Marketing High Technology** (3)
Emphasis on differentiating the marketing process used for marketing high technology and high technology products from that employed by firms offering a standard product line. Market analysis, product planning, channels of distribution, pricing, promotion, decision making, and developing an integrated marketing plan. Primarily for M.S. in I.S. students. Divita

257 **Marketing and Public Policy** (3)
Examination of principal areas of public policy formulation affecting marketing practice. Topics: advertising, warranties, product safety, health issues, consumer information systems, informal and formal redress mechanisms, business responsibilities. Government, business, and advocate viewpoints presented. Permission of instructor may waive the departmental prerequisite. Divita

259 **Marketing Strategy** (3) Divita, Rai
Required capstone course for marketing students. Analysis of complex marketing problems involving policy and operational decisions, emphasis on creative marketing strategy. Prerequisite: completion of at least three second-level marketing courses, excluding Mktg 241. (Spring) Staff

290 **Special Topics** (3)
Experimental offering; new course topics and teaching methods. May be repeated once for credit. Staff

298 **Directed Readings and Research** (3) Staff

299 **Thesis Seminar** (3) Staff

300 **Thesis Research** (3) Staff

311 **Seminar: Public–Private Sector Institutions and Relationships** (3)
Same as SMPP 311.

341 **Seminar: Marketing** (3) Achrol, Dyer, Liebrenz-Himes, Rau, Hassan
Examination of major theoretical developments in marketing. Open only to doctoral candidates. Staff

398 **Advanced Reading and Research** (arr.)
Limited to doctoral candidates preparing for the general examination. May be repeated for credit. Staff

399 **Dissertation Research** (arr.)
Limited to doctoral candidates. May be repeated for credit.

MASTER OF BUSINESS ADMINISTRATION

The following courses constitute core requirements for graduate programs in accountancy and business administration. See the School of Business and Public Management for programs of study leading to the degrees of Master of Accountancy, Master of Business Administration, Master of Professional Accounting, and Master of Taxation. MBAd courses are taught by faculty members school-wide.

201–2 **Organization, Management, and Leadership** (2–2) Halal, Swierez, D. Cohen, McHugh, Lobuts, Empson
Integrative approach to organizational concepts, management principles, and the effects of leadership styles and human resource policies and practices on organizational performance in a global and competitive work environment. MBAd 201 is prerequisite to MBAd 202.

210 **Financial Accounting** (3) Singleton, Sheldon, Sto
Same as Accy 201.

211 **Managerial Accounting** (2) Lindahl, Pass, Ego
Cost information in managerial decisions and operations of the firm. Cost data collection and analysis. Cost accumulation process. Techniques for using cost

data in decision making, planning, control, and performance evaluation and in financial reporting and performance evaluation by others. Credit cannot be earned for both MBAd 211 and Accy 202. Prerequisite: MBAd 210.

220 **Statistical Analysis for Managers** (2) Sover, Wirtz, Sanchez, Forman, Covaliu, Zalkind, Prasad

Statistical concepts employed in the solution of managerial problems. Descriptive statistics, frequency distributions, probability, sampling distributions, statistical inference and testing, correlation analysis, regression modeling, analysis of variance. Introduction to forecasting and statistical process control. Statistical software is used for applications.

221 **Information Systems Technology** (2) Coyne, Carson, Artz

Survey of the advanced information technologies used in various business areas. Introduction to digital multimedia, virtual reality, expert systems, advanced computer networks.

230 **Marketing Management** (3) Dyer, Divita, Liebrenz-Himes, Hassan, Maddox, Rau, Achrol, Iacobina

Emphasis on the marketing process from the viewpoint of the firm. Market analysis, product planning, channels of distribution, pricing, and promotional decision making; developing an integrated marketing plan.

231 **Operations Management** (3) Forman, Perry, Bagchi, Sanchez, Sover, Covaliu, Zalkind, Prasad

Fundamentals of operations management and strategic and tactical decision making. Inventory management, resource allocation, production planning, project management, location and transportation analysis, investment planning, queuing systems, equipment selection and maintenance. Prerequisite: MBAd 220.

240 **The World Economy** (2) Askari, Park, Rehman, Yang

Assessment of international economic and financial developments and their effect on corporate business activity. Prerequisite: Econ 219.

250 **Financial Management** (3) Klock, Jabbour, Handorf, Seale, Epplı

Theory, policy, and practice in financial management, financial analysis, sources of funds, investing, capital budgeting and structure, risk analysis, cost of capital, and dividend policy. Prerequisite: Econ 219, MBAd 210, 220.

260 **Business and Public Policy** (3) Lenn, Englander, Starik, Burke

Political, legal, economic, and ethical forces acting on business. Interaction of the market system and public policy process in the development of law and regulation.

270 **Strategy Formulation and Implementation** (3) Davis, Thurman, Cook, Starik, Kim

An integrative approach to strategic management, stressing formulation, implementation of strategy and policy, and evaluation and control of strategy in various types of organizations. Prerequisite: M.B.A. degree candidacy and completion of all other M.B.A. core requirements.

295 **Interdisciplinary Projects** (1 to 4) Staff

Project and experiential studies of an interdisciplinary nature involving student teams and faculty from more than one field of study. May be repeated for credit. M.B.A. Program Director approval is required.

MATHEMATICS

Professors I. Katz, H.D. Junghenn (*Chair*), I.I. Glick, M.M. Gupta, R. Simon

Associate Professors M.P. Lee, E.A. Robinson, F.E. Baginski, D.H. Ullman, V. Harizanov, F.C. Harkett, M. Moses, J. Bonin, J. Przytycki

Assistant Professor Y. Rong

Master of Arts in the field of mathematics—Prerequisite: a bachelor's degree with a major in mathematics from this University, or an equivalent degree.

Requires the general requirements stated under Columbian School of Arts and Sciences. Students must complete 30 credit hours of approved course work in mathematics, with no more than 6 hours of approved 100-level courses, and must pass a comprehensive examination in six subjects selected with the approval of the department from: algebra, analysis, topology, differential equations, numerical analysis, and linear algebra advanced

Master of Arts or Master of Science in the field of applied mathematics—Prerequisite: a bachelor's degree with a major in mathematics or a related field such as statistics, a physical science, engineering, or economics.

Required: the general requirements stated under Columbian School of Arts and Sciences. Course work is divided between mathematics courses and approved courses from one area of application selected from physics, statistics, computer science, operations research, economics, or civil, electrical, or mechanical engineering.

Candidates for the degree of Master of Arts or Master of Science in the field of applied mathematics must complete 30 credit hours of approved course work. At least 18 credit hours must be in mathematics courses, with no more than 6 hours of approved 100-level courses. A comprehensive examination must be passed in three subjects selected with the approval of the department from algebra, analysis, topology, differential equations, numerical analysis, and linear algebra/advanced calculus.

Doctor of Philosophy in the field of mathematics—Required: the general requirements stated under Columbian School of Arts and Sciences. The General Examination consists of a preliminary examination in three subjects selected from algebra, analysis, topology, differential equations, numerical analysis, and linear algebra/advanced calculus, and a topical examination in a research area approved by the department. A language examination to demonstrate reading knowledge of mathematics in an approved research language is also required. The research field for the dissertation must be approved by the department.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Program Bulletin for course listings.

201–2 **Algebra I–II** (3–3)
Group theory including symmetric groups, free abelian groups, finitely generated abelian groups, Sylow theorems, solvable groups. Factorization in commutative rings, rings of polynomials, chain conditions, semisimple rings, Wedderburn–Artin theorems, Galois theory. Kate Lee

203 **Algebra III** (3)
An extension of the material of Math 201–2, including Frobenius' theorem on associative division algebras, the Hurwitz problem on composition of forms, valuation theory, formally real fields, rings without finiteness conditions, elements of homological algebra with applications. Kate Lee

204 **Representation Theory** (3)
Representations of finite groups, including the symmetric group, group characters, and induced representations. Prerequisite: Math 202. Kate Lee

205 **Matrix Theory** (3)
Topics to be chosen from generalized inverses of matrices and their applications to solutions of equations and to LP problems, positive definite matrices and their applications; Riemann matrices, linear groups, quadratic forms, Hilbert's eleventh problem, numerical range of linear operators. Kate Lee

206 **Topics in Algebra** (3)
Topics chosen from Lie groups and Lie algebras, non-associative algebras, finite groups, classical groups, algebraic number theory, algebraic geometry, and Galois theory. Prerequisite: Math 201–2. May be repeated for credit with permission. Junghenn and staff

211 **Complex Analysis** (3)
Topology of the complex plane; complex differentiation and integration; Cauchy's theorem and its consequences, Taylor and Laurent series, classification of singularities; residue theory, conformal mapping, the Riemann mapping theorem. Prerequisite: Math 139 or equivalent. Glick and staff

214 **Measure and Integration Theory** (3)
Lebesgue measure and integration in abstract spaces. Probability measures, absolute continuity, the Radon–Nikodym theorem, measures on product spaces, and the Fubini theorem. L^p spaces and their properties. Prerequisite: Math 139 or equivalent. Robinson and staff

215 **Introduction to Functional Analysis** (3)
Topological and metric spaces, Tychonoff theorem, Banach spaces, linear functionals and operators, Hahn–Banach, closed graph and open mapping theorems, uniform boundedness, Hilbert spaces, eigenvalues, projections. Prerequisite: Math 214 or equivalent.

216 **Topics in Real and Functional Analysis** (3) Staff
Possible topics include Banach algebras, function algebras, spectral theory for bounded and unbounded operators, harmonic analysis on topological groups and semigroups, topological vector spaces and operator algebras, ergodic theory, and dynamical systems. Prerequisite: permission of instructor. May be repeated for credit with permission.

217 **Ordinary Differential Equations** (3) Glück, Hockett
First course in ordinary differential equations. Existence and uniqueness of solutions, continuity and differentiability of solutions with respect to initial conditions. Properties of linear systems, phase portraits, planar systems and Poincaré-Bendixson theory. Prerequisite: Math 349 or equivalent.

219 **Partial Differential Equations** (3) Bagnoski
Classical techniques for the solution of linear partial differential equations. Laplace's equation, Poisson's equation, heat equation, and wave equation. Existence and uniqueness of solutions. Maximum principles. Separation of variables, Fourier series, eigenfunction expansions, and Green's functions. Prerequisite: Math 140 or permission of instructor.

221 **Modern Partial Differential Equations** (3) Bagnoski
Emphasis on modern theory and analytical techniques applied to the solution of partial differential equations. Topics include Sobolev spaces, generalized solutions, strong solutions and regularity, Sobolev imbedding theorem, Rellich–Kondrachov theorem, Leray–Schauder fixed-point theorems, nonlinear eigenvalue problems. Prerequisite: Math 219 or permission of instructor.

222 **Introduction to Numerical Analysis** (3) Gupta
Computer arithmetic and round-off errors. Solution of linear and nonlinear systems. Interpolation and approximations. Numerical differentiation and integration. Eigenvalues and eigenvectors. Prerequisite: Math 33 and computer programming.

223 **Numerical Solution of Ordinary and Partial Differential Equations** (3) Gupta
Initial and boundary value problems for ordinary differential equations. Error propagation, convergence and stability. Finite difference and finite element methods for partial differential equations. Prerequisite: knowledge of differential equations and computer programming.

225 **Ergodic Theory** (3) Robinson
Ergodicity, mixing, the K-property and the Bernoulli property. Poincaré recurrence, the Rohlin lemma, the ergodic theorem, and entropy theory. Additional topics from isomorphism theory, spectral theory, the theory of joinings, and coding theory. Prerequisite: Math 214 or permission of instructor.

226 **Dynamical Systems and Chaos** (3) Hockett
Linear and nonlinear systems, flows, Poincaré maps, structural stability. Examples of chaotic systems in the physical sciences. Local bifurcations, center manifold theory, normal forms, the averaging theorem. Hyperbolic invariant sets, strange attractors, the Smale horseshoe, symbolic dynamics. Prerequisite: Math 124 and 140 or permission of instructor.

231 **Topics in Applied Mathematics** (3) Bagnoski, Glück
Possible topics include, but are not limited to, the calculus of variations, control theory, nonlinear partial differential equations, and mathematical programming. May be repeated for credit.

232 **Topics in Numerical Analysis** (3) Gupta
Numerical methods and software. Introductions to the methods, tools, and ideas of numerical computation. Problem solving using standard mathematical software obtained from the Internet. Interpolation, linear and nonlinear equations, Differential equations. Prerequisite: knowledge of matrix theory, differential equations, and a programming language.

244 **Computational Methods for Partial Differential Equations** (3) Bagnoski
Computational methods for the solution of partial differential equations, variational formulations and the finite element method. Prerequisite: Math 124 and knowledge of a programming language, or permission of instructor.

261 **Combinatorics** (3) Benno, Simson, Ullman
A graduate level introduction to fundamental methods and current research problems in partially ordered sets, constructive combinatorics, tableaux, partitions. Prerequisite: undergraduate modern algebra and linear algebra or permission of instructor.

262 **Graph Theory** (3) Bonin, Simion, Ullman
Graphical enumeration, factors, planarity and graph coloring, algebraic graph theory, extremal graph theory, problems ranging from classical results to current research, applications. Prerequisite: undergraduate modern algebra and linear algebra or permission of instructor.

263 **Topics in Combinatorial Mathematics** (3) Bonin, Simion, Ullman
Topics selected from a wide range of research subjects in combinatorics, its relations with other areas of mathematics, and applications. Recent selections have included matroid theory, topological methods in ordered sets, algebraic methods in combinatorics, fractional graph theory, combinatorics of polytopes, the symmetric group. May be repeated for credit.

271 **Mathematical Logic** (3) Harizanov, Moss
Model theory, the relation between a formal language (syntax) and its interpretations (semantics). Consistency, completeness, and compactness. Tarski's theorem on the inexpressibility of truth. Godel's incompleteness theorem and its impact on mathematics.

272 **Topics in Logic** (3) Harizanov, Moss
Topics selected from a broad spectrum of areas of logic and applications, based on students' suggestions and interests. May be repeated for credit.

281 **General Topology** (3) Rong, Przyty
Topological spaces, bases, open sets and closed sets; continuous maps and homeomorphisms; connectedness and compactness; metric topology; product topology and quotient topology; separation axioms; covering spaces and fundamental groups.

282 **Algebraic Topology** (3) Rong, Przytyck
Fundamental groups and the Van Kampen theorem, simplicial complexes, simplicial homology, and Euler characteristic, singular homology, Mayer–Vietoris sequences. Topics may include cohomology, cup products, and Poincare duality; classification of surfaces; knots and their fundamental groups. Prerequisite: Math 281 or permission of instructor.

287 **Differentiable Manifolds** (3) Glick, Rong, Przytyck
Smooth manifolds, tangent vectors and tangent bundles, submanifolds, imbeddings and immersions, vector fields. Additional topics chosen from Sard's theorem, transversality, orientability, tensors, differential forms and Stokes's theorem, deRahm cohomology, Riemannian metrics. Prerequisite: Math 281 or permission of the instructor.

289 **Topics in Topology** (3) Rong, Przyty
Topics may include hyperbolic structures on surfaces and 3-manifolds; knot theory, topology of 3-manifolds; topology of 4-manifolds. Prerequisite: Math 282 or permission of the instructor. May be repeated for credit with permission.

295 **Reading and Research** (arr.) Staff
May be repeated for credit.

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

MECHANICAL ENGINEERING

See **Civil, Mechanical, and Environmental Engineering.**

MICROBIOLOGY AND IMMUNOLOGY

The Department of Microbiology and Immunology offers the courses listed below in support of basic science programs offered by Columbian School of Arts and Sciences.

212 **Pathogenic Bacteriology** (3)
Lecture course, with focus on the molecular events of the host–pathogen relationship. (Spring)

225 **Microbial Physiology I** (3)
Microbial structure, nutrition, transport, growth, genetics, metabolism, regulatory mechanisms. Prerequisite: Bioc 221–22. (Fall)

226 **Microbial Physiology II** (3) Staff
The actions of antimicrobial agents and antibiotics on the structure and biochemistry of microorganisms at the cellular and molecular level. Prerequisite: Micr 225 or permission of instructor. (Spring)

229 **Immunology** (3) Albright
Lecture course. Fundamental immunologic concepts. Antigens, antibodies, antigen and antibody reactions *in vitro* and *in vivo*, and the immune response. Prerequisite: Bioc 221–22. (Fall)

233 **Virology** (3) Stokes
Biochemical, genetic, and pathogenic characterization of viruses. Prerequisite: Bioc 221–22 or permission of instructor. (Fall)

235 **Human and Transforming Viruses** (3) Holland
Current concepts of transformation and disease caused by RNA and DNA viruses. Prerequisite: Micr 233. (Spring)

258 **Microbial Genetics** (2) Staff
Survey of microbial systems that depict basic concepts of genetic principles. (Spring)

260 **Cellular and Molecular Immunology** (3) Albright
Advanced seminars in cellular and molecular immunology. Prerequisite: Micr 229. (Spring)

277–78 **Seminar: Microbiology** (1–1) Staff
Required of graduate students. (Academic year)

293 **Special Topics** (arr.) Staff
Selected topics in microbiology. May be repeated for credit. (Fall and spring)

295 **Research** (arr.) Staff
Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

MOLECULAR AND CELLULAR ONCOLOGY

S.K. Pattengale (*Director*), I.D. Ahlgren, B. Bouscarel, A.M. Colberg-Poley, E.C. DeFabo, B. Derrick, A.L. Goldstein, C.C. Haudenschild, T. Hla, C. Holland, S.P. Ivy, A.D. Keegan, J.K. Kercher, K.A. Kennedy, P. Klubes, A. Kumar, S.K. Ladisch, P.S. Latham, G. Lau, H.G. Marstad, M.J. Manyak, W.D. Merritt, D.W. Morris, F.P. Noonan, I.M. Orenstein, R.A. Petricoin, G.H. Reaman, G.C. Rodgers, J.M. Rosenstein, A.M. Schwartz, D. Scott, H. Schwartz, R.S. Siegel, M.A. Stepp, I.A. Tabbara, B.W. Wessels, W.R. Wilson, J.A. Wolkoff, X. Zhan

Doctor of Philosophy in the field of molecular and cellular oncology—Prerequisite: A bachelor's degree in chemistry, biological sciences, or an approved related field. Required the general requirements stated under Columbian School of Arts and Sciences. Course work must include the biomedical sciences core curriculum and Onco 221, 222, 223, 224. Courses related to molecular and cellular oncology that may be included in the program include: Anat 256, 260, 261; Bioc 234, 250, 251, 252, 270; BiSc 126, 227, 229, 246, 274, 275; E&RP 210; Gnet 250; Micr 229, 233, 258, 260; Phar 240, 242; Rad 203, 207, 227, 129.

Research fields. Chemical, viral, nutritional, UV light, and radiation carcinogenesis; tumor cell biology and metabolism; gene regulation, oncogenes and tumor suppressor genes; growth factors; chemotherapy and mechanisms of resistance; radiotherapy; immunotherapy; immunology of bone marrow transplant; development of immunological and molecular markers for diagnosis and detection; tumor immunology; epidemiology and prevention; cancer and AIDS; mechanisms of metastasis.

221 **The Basic Science of Oncology** (3)
Epidemiology, genetics, viruses, oncogenes, chemical carcinogenesis, radiation carcinogenesis, tumor growth, metastasis, biochemistry of cancer cells, tumor markers, hormones and cancer, cancer immunobiology, radiotherapy, chemotherapy and immunotherapy. (Fall)

222 **Molecular Oncology** (2)
Seminar course dealing with molecular basis for the topics introduced in Onco 221. (Spring)

224 **Research Seminar** (2)
Forum for students to present their research findings before fellow students and program faculty for critical evaluation. Admission by permission of instructor.

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

MUSEUM STUDIES

Committee on Museum Studies
K. Rice (*Interim Director*), R.L. Humphrey, C.R. Rose, A.D. Andrews, J. Vlach

Columbian School of Arts and Sciences offers an interdepartmental program leading to the degree of Master of Arts in the field of museum studies. The program is designed for those who seek a deepening of their primary academic interest along with training in the broad range of talents required in the successful operation of museums. The goal of the program is to produce graduates who are prepared to assume museum positions that require both scholarship and functional skills. (Students whose career interests are primarily curatorial should consider applying for the Master of Arts in their academic discipline with a concentration in museum training; those interested in museum education should refer to the Master of Arts in Teaching under the Graduate School of Education and Human Development.)

Students applying for candidacy in the Museum Studies Program must meet all general requirements for admission to Columbian School of Arts and Sciences. The student must have an undergraduate major, or its equivalent, relevant to the proposed academic work and must be able to demonstrate a sufficient breadth of academic preparation to support the proposed graduate course of study. Prior museum training is not a requirement.

In preparing the academic core portion of the program of study, students draw on courses offered by the appropriate academic departments. Courses relevant to the museum studies portion of the program are described below and are supplemented by additional courses offered by other departments, such as American Studies, Anthropology, Art, Educational Leadership, and Theatre and Dance.

The Committee on Museum Studies serves the Museum Studies Program in an advisory capacity. Its members are drawn from several departments of the University and from the Smithsonian Institution.

Master of Arts in the field of museum studies—Required: the general requirements stated under Columbian School of Arts and Sciences. The degree requires a minimum of 42 hours of course work. At least 15 hours of course work must be in an academic discipline, for example, American studies, anthropology, biological sciences, geological sciences, paleobiology, history, or an appropriate interdisciplinary combination. A concentration in art history is possible only in the Art Department. At least 15 hours of course work must be in museum studies courses that concern such functions as museum administration, collections management, exhibiting, and object care and conservation. At least 6 hours must be in museum internships in the Washington area or elsewhere. The student must pass a comprehensive examination based on course work and submit a research paper.

201 **Introduction to Museum Studies: History and Philosophy of Museums** (3)
Museums viewed from historical, philosophical, and practical perspectives. Examination and comparison of types of collecting organizations. Analysis of contemporary studies on the status of museums and their public programs. (Fall)

202 **Introduction to Museum Studies: Administration** (3)
Overall operation of the museum: legal status of the museum and its obligations to the public; governance; staffing; policymaking as a nonprofit organization. Theory applied to practical situations. (Spring)

203 **Fiscal Management of Nonprofit Organizations** (3)
Basic concepts of general accounting; fund accounting for nonprofit organizations; budgets and budget systems; use of the budget as a management tool; long range planning; income sources; other financial management concerns. (Spring)

215 **Collections Management: Legal and Ethical Issues** (3)
Establishing collections policies; laws, regulations, conventions, and codes that affect acquisitions, deaccessions, loans, and collection care; accountability; access problems. (Fall)

216 **Collections Management: Practical Applications** (3) K. Spiess
The implementation of collections policies: establishing and managing collections, management procedures and systems, documentation of collections, records preservation, collections access and storage, handling, packing and shipping, and inventory control. May be repeated for credit. (Fall and spring)

270 **Museum Exhibition: Curatorial Research and Planning** (3) Busch, Rice
Museum research from a curatorial point of view, with emphasis on exhibit conceptualization and development. Research techniques, information sources, script production. May be repeated for credit. (Fall and spring)

271 **Museum Exhibition: Design Processes** (3 or 6) Sims, Volkert
The processes of research, conceptualization, planning, and evaluation from a designer's point of view. Focus is on individual projects with some group collaboration. The designer's vocabulary, visual thinking, design documentation, and specifications. (Fall and spring)

291 **Museum Internship** (1 to 6) Rice
Individual work experience in museums of the Washington area and possibly elsewhere. Each student should make arrangements with the Director of the Museum Studies Program. Museum internships are supervised by one or more members of the cooperating museum staff in the areas of museum management, object care and conservation, exhibiting. (Fall, spring, and summer)

295 **Directed Research** (3) Staff
Individual research on special topics in the museum field. Topics must be approved by the Director of the Museum Studies Program. May be repeated for credit. (Fall, spring, and summer)

297 **Special Topics** (3) Staff
May be repeated for credit provided the topic differs.

NEUROSCIENCE

V.A. Chiappinelli (*Director*), T. Achacoso, J. Battey, M. Badamchian, A. Chiaramello, S. Deglurkar, S. Huang, J.I. Kelly, L.M. Krum, C.W. Linebaugh, S.A. Moody, T.W. Moody, A. Murphy, R.J. Packer, D.C. Perry, K.D. Pearsner, J.M. Rosenstein, R.E. Rosenthal, L.A. Rutledge, D. Schessel, S.J. Schiff, E.M. Sorenson, P. Vera, R.J. Walsh, L.L. Wenting

Doctor of Philosophy in the field of neuroscience—Prerequisite: A bachelor's degree in chemistry, biological sciences, or an approved related field.

Required: the general requirements stated under Columbian School of Arts and Sciences. The curriculum consists of 72 credit hours, including the biomedical sciences core curriculum, and 12 to 24 hours of dissertation research. Course work must include Biol 280, Neur 220, 292, 294, Phar 280, Psyc 268 or 284. Courses related to neuroscience that may be included in the program include Anat 253, 277; Biol 250, 266; Micr 229; Psyc 228, 282. Research fields: cerebral ischemia, neural transplantation, molecular mechanism of action of drugs of abuse, neurotransmitter systems, neuropeptides, developmental neurobiology, psychobiology of learning and memory, function of ion channels and receptors.

220 **Neurodegenerative Diseases** (2)
Pathophysiology of neurodegenerative diseases from the perspectives of clinical and basic science investigators.

291 **Neuroscience Internship** (2)
Limited to Ph.D. candidates in the neuroscience program. Rotation through several laboratories during the first year of study.

292 **Seminar** (1)
Research reports and discussions by guest lecturers, faculty, and students. May be repeated once for credit.

293 **Current Topics in Neuroscience** (1)
Presentations and discussion on current topics based on journal publications.

296 **Advanced Studies** (1)
Presentation and discussion of research by invited speakers. A different area of neurobiology will be studied each semester.

298 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

OPERATIONS RESEARCH

Professors N.D. Singpurwalla, J.E. Falk, R.M. Soland (*Chair*), T.A. Mazzuchi, G. Frieder
Adjunct Professor R.H. Clark
Professorial Lecturers J.F. Ince, J.L. Kreuser
Associate Professorial Lecturer C.H. Voas
Assistant Professors T.Z. Irony, H.G. Abeledo

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees

201 **Survey of Operations Research: Deterministic Models** (3) Abeledo and Staff
Basic concepts and techniques of deterministic operations research modeling as applied to problems in industrial and governmental decision making. Linear, integer, nonlinear, and dynamic programming; networks; game theory. Prereq: uisite: Math 33 or permission of instructor. (Fall)

202 **Survey of Operations Research: Stochastic Models** (3) Soland and Staff
Basic concepts and techniques of stochastic operations research modeling as applied to problems in industrial and governmental decision making. Markov chains, queuing, inventory, regression analysis, forecasting, decision analysis, and simulation. Prerequisite: ApSc 115, Math 33, or permission of instructor. (Spring)

209 **Mathematics in Operations Research** (3) Abeledo and Staff
Mathematical foundations of optimization theory, linear algebra, advanced calculus, and real analysis. Geometrical interpretations. Numerical methods and use of software. Applications to modeling techniques in operations research. Prerequisite: Math 33. (Fall and spring)

216 **Stochastic Foundations of Operations Research** (3) Irony and Staff
Topics in probability theory, stochastic processes, and statistical inference. Foundations of probability, conditional probability, the Poisson process, Markov chains, and Bayesian inference. Introduction to modeling and decision making using influence diagrams. Prerequisite: ApSc 116 or permission of instructor. (Fall and spring)

235 **Systems Thinking and Policy Modeling I** (3) Clark and Staff
Stock-flow analysis of feedback systems presented for policy analysis and management. System dynamics; principles of systems employed to structure problem-solving process. Systems modeling using microcomputers. Fa and summer)

236 **Systems Thinking and Policy Modeling II** (3) Clark and Staff
Case studies in dynamic policy analysis. Use of microcomputers in simulation. The class collectively models and simulates a social system to explore policy options. Prerequisite: OR 235. (Spring)

237 **Logistics Planning** (3) Mazzuchi and Staff
Quantitative methods in model building for logistics systems, including organization, procurement, transportation, inventory, maintenance, and their interrelationships. Stresses applications. Prerequisite: ApSc 115, Math 33 (Spring, even years)

251 **Linear Programming** (3) Abeledo and Staff
The simplex method, its variants, and recent interior point methods considered from theoretical and computational points of view. Duality, sensitivity, and parametric programming. Decomposition methods for large-scale problems. Prerequisite: OR 209 or permission of instructor. (Fall and spring)

252 **Nonlinear Programming I** (3) Falk and Staff
Basic theoretical and computational topics in optimization theory, including convexity and the optimality conditions. Algorithms for solving unconstrained, linearly constrained, and nonlinearly constrained problems. Applications. Prerequisite: OR 209 or permission of instructor. (Spring)

253 **Integer and Network Programming** (3) Abeledo and Staff
Combinatorial optimization problems: algorithms and applications. Network problems: minimum spanning tree, shortest path, maximum flows, minimum cost flows, optimal matchings, routing problems. Complexity theory. Branch and bound and cutting plane methods for solving integer programs. Prerequisite: OR 251 or permission of instructor. (Spring, odd years)

254 **Applications of Linear and Nonlinear Optimization Theory** (3) Falk and Staff
Analysis of optimization models, including areas of nutrition, water pollution, energy, reliability, inventory control, game theory, chemical equilibrium, portfolio selection, and parameter estimation. Solution of models via the GAMS modeling software. Prerequisite: Math 33. (Fall)

261 **Theory of Games** (3) Falk and Staff
Mathematical models of conflict and cooperation with applications in economics, business, defense, transportation, and societal issues (voting schemes, fair division, auctions). Concept and computation of equilibrium in n-person games. Prerequisite: Math 33. (Fall)

262 **Decision Analysis** (3) Soland and Staff
Decision making under certainty, uncertainty, and one and several criteria. Decision analysis and decision trees, value of information, subjective probability and Bayesian statistics, utility and value theories, multiple-criteria decision making and optimization, goal programming. Prerequisite: ApSc 116 and OR 201 or 251, or permission of instructor. (Fall, even years)

271 **Forecasting Techniques** (3) Mazzuchi and Staff
Regression analysis and other heuristic forecasting techniques. Detailed development of the Box–Jenkins technique for time-series analysis, including moving averages and exponential smoothing as special cases. Application to engineering, business, and economics using special computer software packages. Prerequisite: OR 216. (Fall)

273 **Discrete Systems Simulation** (3) Irony and Staff
Simulation of discrete stochastic models. Simulation languages. Random-number/random-variate generation. Statistical design and analysis of experiments, terminating/nonterminating simulations, comparisons of system designs. Determination of input distributions. Variance reduction. Validation of models. Prerequisite: ApSc 116, CSci 51, or permission of instructor. (Spring)

277 **Queuing Theory** (3) Mazzuchi and Staff
Single-channel exponential queuing systems. Markovian single- and multiple-channel models, including birth–death processes, finite sources, Erlangian models. General arrival and service patterns. Jackson networks. Model building, basic solution techniques, and formal theoretical developments. Prerequisite: OR 216 or permission of instructor. (Spring)

279 **Inventory Control** (3) Mazzuchi and Staff
Mathematical techniques applied to decisions about when and how much to produce or purchase. Mathematical models of inventory systems with deterministic and stochastic demands, continuous and periodic review policies, multi-item models with constraints, multi-echelon models. Prerequisite: ApSc 116 or permission of instructor. (Fall, odd years)

281 **Reliability Theory I** (3) Singpurwalla and Staff
Mathematical theory: coherent structures, association of random variables, stochastic characterization of wear, preservation theorems, bounds and inequalities. Statistical theory: probabilistic derivation of failure models; Bayesian methods. Life testing, survival analysis, expert opinion. Prerequisite: OR 216 or permission of instructor. (Fall)

282 **Quality Control and Acceptance Sampling** (3) Mazzuchi and Staff
Mathematical and statistical approaches to quality assurance. Control charts, acceptance sampling by attributes and variables, outgoing quality levels, cost of quality, relationship between reliability and quality, Bayesian techniques and time-series methods. Prerequisite: ApSc 115 or permission of instructor. (Spring)

284 **Computer-Intensive Methods in Industrial and Engineering Statistics** (3) Singpurwalla, Toman, and Staff
Computer-aided design and analysis of industrial experiments, including factorial, Taguchi, and other designs. Analysis of survival, reliability, and quality control data, including reliability growth and point processes. Simulation techniques in reliability analysis. Corequisites: OR 281, Stat 217. Same as Stat 284. (Every odd years)

291 **Problems in Operations Research** (3) Soland and Staff
Field experience in operations research on a team basis. Each small group locates an actual problem and formulates a solution using operations research

models. Oral and written reports. Prerequisite: completion of five OR graduate courses or permission of instructor. (Fall and spring)

297 **Special Topics** (3) Falk and Staff
Selected topics in operations research, as arranged. May be repeated for credit. Prerequisite: permission of instructor. (As arranged)

298 **Research** (arr.) Staff
Basic or applied research in operations research. May be repeated for credit.

299–300 **Thesis Research** (3–3) Staff

351 **Advanced Topics in Mathematical Programming** (3) Falk and Staff
Fractional and geometric programming, branch-and-bound methods, max-min problems, lagrangian algorithms, nonconvex optimization techniques. Prerequisite: OR 252 or permission of instructor. (Spring, every third year)

352 **Nonlinear Programming II** (3) Falk and Staff
Optimality conditions, convex analysis, development of families of unconstrained and constrained algorithms. Discussion of key results in mathematical programming, such as duality, rate of convergence, nonconvex programming, and sensitivity analysis. Prerequisite: OR 252 or permission of instructor. (Fall)

353 **Sensitivity and Stability Analysis in Optimization** (3) Abeledo and Staff
Effects of data perturbations on solutions of a nonlinear programming problem. Theoretical results that characterize and validate calculation of sensitivity of optimal values, solution points, and multipliers with respect to changes in parameters. Sensitivity formulas, bounds for optimal values and solution points. Prerequisite: OR 252. (Spring, every third year)

354 **Optimization Using Factorable Functions** (3) Falk and Staff
Nonlinear programming when the problem functions are factorable. Presents structure of derivatives, high order unconstrained algorithms, matrix methods for nonlinear programming, global solution to nonconvex programs. Karmarkar's projective method and related interior point methods. Prerequisite: OR 252. (Spring, every third year)

371 **Advanced Topics in Forecasting** (3) Singpurwalla and Staff
Dynamic linear models, Kalman filtering, non-Gaussian filtering, spectral analysis, simulation techniques and optimal control. Prerequisite: OR 271 or permission of instructor. (Spring, even years)

373 **Design and Analysis of Simulation Experiments** (3) Irony and Staff
Special topics from among perturbation and sensitivity analysis, initial transient problems and warm-up periods for nonterminating simulations, variance reduction techniques, response surface methods, developments in simulation software. Prerequisite: OR 273 or permission of instructor. (Fall, even years)

377 **Advanced Stochastic Models in Operations Research** (3) Mazzuchi and Staff
Applied probability models, including the Poisson process, continuous and denumerable-state Markov processes, renewal theory, semi-Markov processes, alternative processes. Applications to queues, inventories, and other operations research systems. Prerequisite: OR 277 or permission of instructor. (Fall)

381 **Reliability Theory II** (3) Singpurwalla and Staff
Mathematical theory, stochastic characterization of multivariate-state systems, models and wear processes, and reliability theory for multistate components. Statistical theory, recent developments in analysis of failure data. Prerequisite: OR 281. (Spring, odd years)

391 **Project for Professional Degree** (3) Soland and Staff
Limited to students in the Applied Scientist degree program. (Fall and spring)

397 **Advanced Topics in Operations Research** (3) Falk and Staff
Advanced topics from the literature of operations research for intensive investigation, and discussion. Reading assignments from professional journals selected by the instructor and the student. May be repeated for credit. Prerequisite: permission of instructor. (As arranged)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Science candidates. May be repeated for credit.

PHARMACOLOGY

Professors H.G. Mandel, P. Klubes, F.P. Abramson, T.L. Loo (*Research*), K.A. Kennedy, V.A. Chiappinelli (*Chair*), S.R. Patierno
Associate Professors D.C. Perry, L.L. Werling
Assistant Professors E.M. Sorenson (*Research*), P. Lecchi (*Research*)

Doctor of Philosophy in the field of pharmacology—Required: the general requirements stated under Columbian School of Arts and Sciences. Course requirements include the biomedical sciences core curriculum.

Research fields: molecular carcinogenesis, genetic toxicology, cancer chemotherapy, neuropharmacology, biochemical and molecular pharmacology and toxicology, drug metabolism, pharmacokinetics, microanalytic pharmacology.

203 Fundamental Principles of Pharmacology and Toxicology (3) Klubes and Staff
Basic principles of pharmacology, including drug receptor interactions, structure activity relationships, pharmacokinetics, membrane phenomena, cellular control mechanisms; mechanisms of mutagenesis, carcinogenesis, teratogenesis, and specific organ toxicity, risk assessment and extrapolation. Admission by permission of the instructor. (Fall)

205 Pharmacology (8) Staff
Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis of rational disease therapy. Prerequisite: Phar 203, courses in biochemistry and physiology, or approval of department. (Fall)

230 Special Topics in Toxicology (arr.) Staff
Selected aspects of toxicology. Content differs each time the course is offered. May be repeated for credit. (Fall and spring)

240 Molecular Pharmacology and Toxicology (2) Patierno
The impact of molecular biology on pharmacology and toxicology. Molecular mechanisms of drug and chemical action. Gene regulation in metabolism, receptor activity, signal transduction, and cellular stress responses. Gene therapy. Prerequisite: Phar 203, Bioc 221–22, or permission of instructor. (Spring)

242 Molecular Carcinogenesis (2) Patierno
Molecular biology of cancer initiation and progression. Molecular mechanisms of DNA sequence alteration and repair. Oncogenes, tumor suppressor genes, and metastasis suppressor genes. Prerequisite: Bioc 221–22 or permission of instructor.

254 Frontiers in Pharmacology (1) Staff
Recent advances and research in pharmacology. Presentations by laboratory scientists from neighboring institutions. (Spring)

259 Readings: Cancer and Cancer Chemotherapy (2) Klubes
Selected readings and discussion of recent advances in cancer and cancer chemotherapy research. Prerequisite: Phar 201 or 205. (Spring, odd years)

269 Pharmacology Seminar (1) Staff
Recent advances in pharmacology. Content differs each time the course is offered; may be repeated once for credit. (Fall)

272 Physiological Disposition of Drugs (4) Staff
Mechanisms for the absorption, distribution, metabolism, and excretion of drugs and the physical, chemical, and biological factors affecting these processes are studied through extensive reading of classical and current original literature. Prerequisite: Bioc 221–22, Phar 204, or permission of the instructor. (Spring)

273 Pharmacokinetics: Principles and Applications (2) Abramson and Staff
A description of compartmental and physiological models of drug disposition. Problem solving to obtain rate constants, organ clearances, etc., from experimental data. Examples of drug disposition exemplifying various pharmacokinetic approaches. (Spring)

275 Advanced Topics in Pharmacology and Toxicology (1) Abramson and Staff
Lectures and seminars on advances in mechanisms of drug action, pharmacology of new drugs, theoretical aspects of pharmacology, laboratory techniques. May be repeated for credit. (Fall and spring)

290 Neuropharmacology (2) Perry, Werling
Fundamental principles. Neurotransmitters and their pathways in the central nervous system. Electrophysiological, molecular, and biochemical techniques.

Drug effects on neurotransmitter pathways. Biochemical basis of mental dis-
ease. Prerequisite: Phar 205 or permission of instructor (Spring, even years)
Staff

295 **Reading and Research** (arr.)
May be repeated for credit.
Staff

299–300 **Thesis Research** (3–3)
Staff

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination.
May be repeated for credit.
Staff

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

PHILOSOPHY

University Professors P.J. Caws, K.F. Schaffner
Professors R.H. Schlagel, R.S. French, W.B. Griffith (*Chair*), R.P. Churchill, A. Altman
Associate Professor D. DeGrazia
Assistant Professor G. Weiss

Master of Arts in the field of public policy with a concentration in philosophy and social policy—An interdisciplinary program that brings the normative, historical, and analytical-logical skills of philosophical inquiry to bear upon contemporary problems of social policy. Prerequisite: a bachelor's degree from an accredited college or university. Students are expected to have completed the prerequisites to graduate courses.

Required: the general requirements stated under Columbian School of Arts and Sciences. Two options are available at the discretion of the faculty: (1) a minimum of 24 credit hours of approved graduate course work plus the successful completion of a thesis (Phil 299–300), or (2) a minimum of 36 credit hours of graduate course work that does not include a thesis. All students are required to take four courses selected from Phil 230, 231, 235, 242, 255, 262, 281, and HCS/Phil 775; and, for the public policy core, four courses, one from each of the following groups: (a) PSc 229, 212, 217; (b) Econ 217, 221, 227, 249; (c) PSc 203, WStu 240, E&RP 210, Hist 213; (d) PPol 211, Stat 183 or 111, PAd 296. Electives may focus on a particular policy area (e.g. biomedical/health care, urban welfare, environmental policy), or may explore varied approaches and policy issues. Each candidate must pass a Master's Comprehensive Examination based on the particular interdisciplinary composition of the student's program of study. Prospective candidates should consult Professor W.B. Griffith, chair of the department.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Program Bulletin for course listings.
Staff

201–2 **Readings and Research** (3–3)
Advanced readings and reports. Investigation of special problems.
Staff
(Academic year)

214 **Structuralism and Hermeneutics** (3)
The notion of structure in the human sciences: its antecedents, function, expression, and development in philosophy, anthropology, psychoanalysis, historiography, and criticism. Strategies for the decoding of structure: hermeneutics. The apparent metamorphosis of structuralism in post-structuralist thinkers.
Graves

230 **Ethical Issues in Policy Arguments** (3)
Critical analysis of ethical foundations of public policy arguments (protection of the environment, health and safety, equality of opportunity). Case studies in appeals to societal values (preference–satisfaction, welfare improvements) to norms of justice or fairness, and to moral rights. Attention to historical relativity and commitments and to racial, gender, and class biases. (Fall)
Staff

231 **Economic Justice** (3)
Ethical and economic analysis of equity and efficiency of current U.S. income distribution patterns. Theories of justice: economic theories of distribution. Ethical assessment of redistribution policies.
Graves, Lee

235 **Ethics and Business** (3)
Concepts and strategies of ethical analysis applied to specific business problems, e.g., risk management, plant relocation, preferential hiring, professional ethics, advertising, development of theory of corporate social responsibility. Same as SMPP 291. (Spring)
Staff

238 **Feminist Ethics and Policy Implications** (3) Weiss
Feminist critiques of traditional ethical reasoning; alternative feminist ethical frameworks examined and applied to contemporary social problems (e.g., reproductive technology, genetic engineering). Prerequisite: Phil 125 or 131 or permission of instructor. Same as WStu 238. (Spring, alternate years)

242 **Philosophy, Law, and Social Policy** (3) Altman
Examination of basic questions about the role law can and should play in society. Topics include the nature and basis of rights, theories of constitutional interpretation; proposals for legal and political reform of Western liberal democracy. (Spring)

255 **Philosophy of Social Science** (3) Altman
An examination of philosophical problems arising from efforts to gain a systematic understanding of society and culture. Topics include the relationship of social science to natural science, feminist social science, rationality, cultural relativism, hermeneutics, and critical theory.

262 **Normative Issues in Foreign Policy** (3) Churchill
Selected issues on foreign policy from a normative perspective, including global poverty and distributive justice, sustainable development, environmental management, the protection of human rights, and the ethics of military intervention.

281 **Environmental Philosophy and Policy** (3) Churchill
Development of philosophical frameworks for analyzing and appraising a wide range of environmental issues and modes of analysis. Attention to both classical problems (pollution, biodiversity) and the new "sustainable economy/ecology" paradigm shift, and to both microeconomic and biocentric modes of analysis and argument.

299–300 **Thesis Research** (3–3) Staff

PHYSICS

Professors O. Bergmann, A.J. Zuchelli, D.R. Lehman, B.L. Berman (*Chair*), L.C. Maximon (*Research*)

Associate Professors W.C. Parke, N.K. Khatcheressian, E.P. Harper, W.L. Briscoe, J.R. Priestley, H. Haberzettl, K.S. Dhuga

Associate Professorial Lecturers J.T. Broach, C.T. Christou

Assistant Professors C. Bernhold, M.E. Reeves, T.P. Devereaux, G. Feldman

Adjunct Assistant Professor A. Eskandarian

Assistant Professorial Lecturer S.L. Rugari

Master of Arts in the field of physics—Prerequisite: a bachelor's degree with a major in physics at this University, or an equivalent degree.

1. The master's degree program *with* thesis—Required: the general requirements stated for the Columbian School of Arts and Sciences, and 30 credit hours of course work in physics, including Phys 211, 213–14, 221–22, 299–300; plus two of the following: Phys 224, 225–26, 231, 233, 234, 243, 244.

2. The master's degree program *without* thesis—Required: the general requirements stated for the Columbian School of Arts and Sciences, and 36 credit hours of course work in physics, including Phys 211, 213–14, 221–22, plus two of the following: Phys 224, 225–26, 231, 233, 234, 243, 244.

The successful completion of a high-level computer language course with a grade of *A* or *B* is required for either option.

Doctor of Philosophy in the field of physics—Required: the general requirements stated for the Columbian School of Arts and Sciences, including the following required courses: Phys 209–10, 211, 213–14, 221–22, 224, 225–226 or 232, 231, 233–34 or 243–44.

Research fields: nuclear physics—experimental and theoretical studies of the structure, electromagnetic and strong interactions, and scattering of few-body systems at low and intermediate energies; solid state physics—high T_c superconductors, ultrasonic probing, neutron scattering in solids, and surface physics.

Consent of a departmental graduate advisor is required for admission to all 200-level courses in physics.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs section for course listings.

209–10 **Theoretical Methods in Classical and Quantum Physics** (3–3) Bennhold
Topics covered include solutions of partial differential equations encountered in physics, techniques of linear algebra; calculus of variations; complex analysis, applications in physics of the theory of analytic functions, integral equations, and group theory in physics. (Phys 209, fall; Phys 210, fall)

211 **Advanced Mechanics** (3) Par...
Analytic methods of mechanics as a basis for modern theory, variational principles, Lagrange's equations, Hamiltonian formulation, canonical transformations, classical perturbation theory. (Fall)

213–14 **Electromagnetic Theory** Zuchel
Principles of electrostatics and magnetostatics with applications to the solution of boundary-value problems in electrically and magnetically active media. Maxwell's equations, time-varying fields, and plane-wave propagation. Radiating systems and scattering of radiation, including multipole fields. Dynamics of relativistic particles and radiation from moving charges. (Phys 213, spring; Phys 214, fall)

221–22 **Quantum Mechanics** (3–3) Harper, Bennhold
General aspects of quantum mechanics with emphasis upon the developmental principles involved. Operators, representations, and transformation theory. Schrodinger and Heisenberg pictures, angular momentum, perturbation theory, scattering theory. (Phys 221, spring; Phys 222, fall)

224 **Statistical Mechanics** (3) Devereux
Systematic development of classical and quantum statistics. Gibbs paradox, microscopic origins of entropy and other thermodynamic variables, fluctuations, ensemble theory, partition functions, distribution functions, density matrices. Applications include the harmonic oscillator, magnetic systems, ideal Fermi–Dirac and Bose–Einstein systems, blackbody radiation, phonons. (Spring)

225–26 **Graduate Laboratory** (3–3) Dhuga, Ri...
Phys 225, selected experiments on nuclear and solid-state physics; Phys 226, electronics. Laboratory fee, $50 per semester. (Academic year)

231 **Quantum Electrodynamics: Theory and Applications** (3) Staff
A presentation of the lower-order effects depending upon the quantal nature of the electromagnetic field. Hamiltonian formulation and field quantization. Perturbation calculations. Compton effect, photoelectric effect, electron-electron scattering, pair creation and annihilation, indices of refraction, divergence difficulties. (Spring)

232 **Quantum Field Theory** (3) Devereux
Covariant presentation of general theory of quantized fields. Boson and Fermion fields, theory of S matrix, dispersion relations, and renormalization programs. (Fall)

233–34 **Nuclear Physics** (3–3) Harper, Brus...
Nuclear interactions, nuclear models, theory of nuclear reactions, ... physics, weak interactions, and electromagnetic interactions. (Phys 233, spring; Phys 234, fall)

243 **Solid-State Physics: Structure and Binding** (3) Devereux
Crystal structure and binding; the reciprocal lattice. X-ray diffraction, ... properties, thermal, electric, optical and magnetic properties of solids, dislocations, and other defects. (Spring)

244 **Solid-State Physics: Electronic Properties** (3) Peverley, Ke...
Electronic properties of solids; band theory, Fermi surfaces. Metals, ... conductors, transport phenomena including thermoelectric and magnetic effects, ... port effects, superconductivity. (Fall)

251 **Selected Topics in Theoretical Nuclear Physics** (3) Staff
May be repeated for credit with permission of graduate advisor.

252 **Selected Topics in Experimental Nuclear Physics** (3) Devereux
May be repeated for credit with permission of graduate advisor.

253 **Selected Topics in Theoretical Condensed-Matter Physics** (3) Staff
May be repeated for credit with permission of graduate advisor.

254 **Selected Topics in Experimental Condensed-Matter Physics** (3)
May be repeated for credit with permission of graduate advisor.

291 **Seminar** (1) Staff
Lectures on current topics in physics. May be repeated twice for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated once for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

POLITICAL MANAGEMENT

Professors F. C. Arterton (*Dean*), M. Siegel (*Visiting*)
Adjunct Professors W. Corson, M. Edwards, B. Rubin
Professorial Lecturers R. Behn, P. Fenn, M. Reese, Y. Scruggs
Associate Professor D. W. Johnson (*Associate Dean*)
Adjunct Associate Professors D. Anderson, J. Hobson, K. Kretman, G. Lebel, S. Wiley
Associate Professorial Lecturers M. Braden, K. Brown, S. Callender, T. Devine, R. Faucheux, W. Greener, E. Grele, H. Hickman, R. Hoewing, E. Lazarus, D. Lowe, C. Mack, M. Mellman, J. Pinkerton, H. Sistare, R. Thomas, D. Walter
Assistant Professor M. Cornfield (*Visiting*)
Assistant Professorial Lecturers A. Mertz, J. Slade, G. Stevens, A. Webb

Through the Graduate School of Political Management, Columbian School of Arts and Sciences offers the Master of Arts in the field of political management. Students focus their study on one of the following areas within political management: lobbying, corporate public affairs, campaign management, issues management, environmental politics, fundraising, polling and strategic research, and political leadership.

Master of Arts in the field of political management—Prerequisite: a bachelor's degree from an accredited college or university; demonstrable interest or experience in politics; and academic standing.

Required: the general requirements stated under Columbian School of Arts and Sciences. The nonthesis program consists of 36 credit hours of course work; the thesis program consists of 30 credit hours of course work and 6 hours of thesis (PMgt 299–300). Students are required to complete a 400-hour internship of supervised political management activity. Students are required to take PMgt 201, 202, 207, 260, plus three courses in the chosen area of focus. Those in the nonthesis program must take PMgt 295.

201 **Fundamentals of Political Management** (3) Johnson and Staff
An introduction to the field of political management. Washington and its centers of power, lobbying and influence, issues and ideology, elections, and ethical considerations. Must be taken in the first semester of studies. (Fall and spring)

202 **Quantitative Methods for Political Managers** (3) Wiley
Techniques of data analysis and the uses and abuses of statistical reasoning, with particular emphasis on applications to electoral campaigns, lobbying, and government relations. Topics include measurement, descriptive statistics, probability, and significance testing. (Fall, spring, and summer)

203 **Statistical Analysis of Political Data** (3) Lazarus
Multivariate analysis and its applications in politics. Topics include significance testing, correlation, bivariate regression analysis, multivariate regression modeling, and factor analysis. Students analyze data from actual political surveys. Prerequisite: PMgt 202 or 211. (Spring)

205 **Quantitative Analysis and Political Strategy** (3) Mellman
Techniques of data analysis for formulating political strategies. Topics include major factors influencing voter decisions, level of voter information and attentiveness to politics, and analysis of major models of demographic groupings that allow targeted campaign appeals. Prerequisite: PMgt 202. (Fall)

206 **Research and Data Collection** (3) Walter
Evaluation of research information used by political managers to prepare position papers, analyze candidate records, buy advertising time, analyze constituencies, and target direct mail for canvassing, registration, and get-out-the-vote campaigns. (Fall)

206 **Speech Writing** (3) Siegel
Analysis and techniques of effective speech writing and speech presentation for public officials and candidates; emphasis on speech writing for campaigns and public policy forums. (Fall and spring)

207 **Strategy and Message Development** (3) Cornfield
The specialized forms of communication that political professionals use to win public support for their candidates and policy positions. Message development the art and craft of persuasion and the integration of research, strategy, tactics and public feedback. (Fall and spring)

210 **Computer Applications for Political Managers** (3) Behn
Introduction to computers in elections and campaigns—including advanced word processing, desktop publishing, statistical analysis of polls, spreadsheets and databases. (Fall, spring, and summer)

211 **Polling** (3) Staff
Survey research uses in campaigns. Major objectives of surveys, designing and drawing samples, constructing and pretesting questionnaires, modes of interviewing, financial implications, practical problems in selecting and monitoring polling organizations, and interpretation of survey data. (Spring)

212 **Political Management and the Media** (3) Greener
Organization, practices, and norms of the major media; media coverage of public officials, political campaigns, legislative battles, interest groups, and issues of public policy. Formulation of strategies for getting favorable news coverage for the issue or candidate and for ending a media crisis. (Spring) Staff

214 **Qualitative Research in Political Management** (3)
Uses and usefulness of focus groups and small-sample interviews; procedures involved in these techniques, implications of psychological and sociological theory; relationship of qualitative and quantitative research. (Summer) Behn

217 **Advanced Computer Applications in Politics** (3)
Advanced desktop publishing, database management, on-line information retrieval from commercial databases, electronic mail systems, and rudiments of multimedia production and data-mapping software. (Summer) Cornfield

218 **Politics and the New Media** (3)
Use of new media in communications between politicians and citizens, effects on political rhetoric, and quality of communications in contemporary politics. (Summer) Staff

220 **Fundraising** (3)
Raising and spending money in political campaigns, referenda contests, issue politics, and lobbying efforts. Budgeting, control of expenditures, accounting procedures, and general strategies for fundraising. (Summer) Staff

221 **Fundraising for Organizations** (3)
Advanced techniques of fundraising for established political organizations. Long-range financial stability for organizations, including membership strategies, direct mail, telemarketing, and special events. (Fall) Siegel, Hobson

230 **Lobbying** (3)
How lobbying and organized advocacy fit into the American political process and development and implementation of advocacy strategies. Lobbying by business, labor, public interest groups, and other nonprofit organizatons; lobbying within and among various branches of government. Prerequisite: PMgt 201 (Fall and spring) Edwards, Coiluonno

231 **Lobbying the Budget Process** (3)
Politics of the budget process, using case studies from recent federal budget cycles. Formal and informal mechanisms of budgeting, the lobbying strategies employed by private and public organizations seeking to influence budgetary decision making, and negotiations within and between executive agencies. Prerequisite: PMgt 230. (Summer) Hoewing, Mack, Grace

232 **Managing Government Relations Programs** (3)
Organizational models and techniques used by corporations and business associations to influence the development of public policy at federal, state and local levels, as well as internationally. (Spring) Grace

233 **Grassroots Politics** (3)
Lobbying and advocacy strategies and techniques at the local level. Grassroots lobbying by corporations, labor unions, civic and nonprofit organizations and special interest groups. (Spring)

237 **Advanced Lobbying Strategy** (3) Sistare, Lowe, Slade
Current case studies of major policy initiatives; simulation of roles of participants in lobbying campaigns; strategies integrating issue research, qualitative and quantitative analysis. Prerequisite: PMgt 230 or 231. (Fall and spring)

240 **Campaign Management** (3) Siegel, Reese, Devine
Orientation to the basic systems that must be managed to produce electoral victory. Importance of the campaign plan and campaign budget as techniques of management. Prerequisite: PMgt 201. (Fall and spring)

241 **Campaign Advertising and Promotion** (3) Fenn
Strategies for the use of the various media in political campaigns, with an emphasis on television and the development of campaign messages; production, timing, and placement of television advertising. Students design print ads and brochures and produce a 30-second television spot. Laboratory fee, $50. Prerequisite: PMgt 240. (Spring)

242 **Campaign Organization** (3) Lebel
Choices facing the campaign manager: assessement of the candidates, making the decision to run, fundraising, geographic and demographic targeting, field organization, canvassing, phonebanks and get-out-the-vote, press operations, financial control, and relations with the party and interest groups. Prerequisite PMgt 240. (Spring)

243 **Strategic Factors in Presidential Campaigns** (3) Devine
Presidential campaign strategy: campaign organization, fundraising, primaries and caucuses, delegation selection rules, party conventions, national and state party organizations, and the general election. (Fall)

245 **Campaign Finance** (3) Staff
Funding political activity: the impact of federal legislation on campaigns, parties, and political action committees, reporting requirements, limitations on contributions, including in-kind services, public funding of presidential campaigns. (Fall)

246 **Political Communications Strategy** (3) Walter, Stevens
The role of the communications director. Message development and implementation of a coordinated communications strategy. Integration of paid and free media coverage. (Summer)

247 **Advanced Campaign Strategy and Management** (3) Reese, Siegel
Strategy, tactics, and management of campaign research, polling, message formulation, and media. Prerequisite: PMgt 240. (Fall and summer)

250 **Issues Management** (3) Rubin
Management of public policy issues, rise of referenda and citizen initiatives, proliferation of issue-oriented campaigns directed at the grassroots. How individuals and interest groups participate in the issue advocacy process and the evolving role of political and campaign managers in issue campaigns. Prerequisite: PMgt 201. (Fall and spring)

251 **Public Opinion Dynamics** (3) Wiley
Processes by which citizens make decisions about political issues and consider the range of methods for influencing those decisions. Public opinion polling, voter behavior studies, communications, media studies, and attitudinal change. Prerequisite: PMgt 211. (Summer)

252 **Crisis Management** (3) Edwards
Management of crisis situations and "defining moments" in electoral, legislative, and public policy campaigns. Through the use of simulation exercises and recent case studies, the course explores both the theoretical and practical aspects of crisis management. (Fall)

253 **Political Power and Urban Diversity** (3) Scruggs
Dynamics of urban growth and the interaction of partisanship and ideology. Historical and contemporary urban power shifts. (Summer)

254 **Referendum Politics** (3) Staff
Managing the politics of initiative petitions and referendum elections to establish public policy. (Spring)

257 **Strategic Management of Political Issues** (3) Pinkerton, Grefe
Case studies of major current policy questions. Development of strategy and message development integrating research, polling, and focus group analysis. (Fall and summer)

260 **Ethics and Political Management** (3) Anderson
Application of ethics to political campaigning, lobbying, and representation generally; norms of conduct that should guide activities and working relations of candidates, campaign consultants, polling organizations, political reporters lobbyists, legislators, and officials. (Fall, spring, and summer)

262 **Law of the Political Process** (3) Braden
Legal and constitutional framework for political process, including ballot a cess, voter registration, and laws governing political parties and political orga nizations, campaign finance, political broadcasting, lobbying registration, wi ethics in public service. (Summer)

265 **Special Topics** (3) Staff
Topic to be announced in the *Schedule of Classes*.

270 **Systems Approach to Environmental Issues** (3) Corson
Analysis of environment-related issues and trends, interrelations among issues science underlying environmental politics, and long-term sustainability of nat ural and social systems. (Fall)

271 **Public Policy and the Environment** (3) Corson
Examination of U.S. laws and current legislation affecting air and water quali ity, energy, agriculture, solid and hazardous waste, population, and other environment-related issues. (Spring)

272 **Community Organization and the Environment** (3) Staff
Role of community and local organizations in shaping environmental poli emphasis on issues of environmental justice and local responsibility (Spring)

280 **Leadership and Politics** (3) Kraut
Leadership in the political realm in comparison to the corporate and nonprofit sectors. (Spring)

281 **Running for Office** (3) Faucheux
Electoral politics from the perspective of the candidate, strategic and personal factors involved in the decision to run, consequences of victory or defeat (Summer)

282 **Leadership in Public Office** (3) Webb, Schaefer
How elected officials must govern while balancing electoral support and po perspectives. (Fall) Staff

283 **Leadership Theory** (3) Staff
Analysis of leadership theory and its application to contemporary politi management. (Fall)

290 **Independent Study** (3 to 6) Advisor

295 **Advanced Problems and Strategy** (3)
Capstone seminar that integrates research skills and political techniques required to define political objectives and develop the appropriate strategies to accomplish such objectives. Students must have completed 24 credit hours to enroll in this course. (Fall, spring, and summer) Staff

299–300 **Thesis Research** (3–3)
Master's degree candidates must apply to the program committee for thesis approval and have completed 24 credit hours with a 3.3 GPA

POLITICAL PSYCHOLOGY

Professor J.M. Post

The Elliott School of International Affairs offers a course sequence (which may lead to a graduate certificate) in political psychology.

201 **Fundamentals of Political Psychology** (3) Post
A review of the interdisciplinary field of political psychology, examining psychological influences on political behavior at the level of the individual, small group, the psychology of leader–follower relationships, crisis decision-making. (Fall) Staff

202 **Political Psychology Research Methods** (3)
Major research methods of political psychology, using classic articles in the field. Both quantitative methods, such as survey research and content analysis, and qualitative methods, such as personality profiling and comparative case studies, are considered. Prerequisite: PPsy 201 (Fall)

203 Public Opinion and Political Socialization (3) Staff
Same as PSc 220.

204 Theory and Practice of International Negotiations (3) Staff
Same as IAff 204.

205 Political Violence and Terrorism (3) Post
The origins and the sociopolitical and behavioral dynamics of political violence and terrorism. Major types of terrorism are differentiated. Implications for anti-terrorist policy. The psychology of hostages. (Spring)

291 Applied Political Psychology (3) Post
Seminar and practicum in applications of political psychology. Prerequisite: PPsy 201. (As arranged)

295 Independent Study and Research (1 to 3) Post
Supervised research in a special topic in political psychology. Preparation of major research paper. Prerequisite: PPsy 201, 202. (As arranged)

POLITICAL SCIENCE

University Professor J.N. Rosenau

Professors B. Reich, Y.C. Kim, J.M. Logsdon, C.A. Linden, H.R. Nau, M.A. East, J.B. Manheim, C. McClintock, P. Reddaway, J.R. Hemig (*Chair*), L. Siegelman, M.J. Sodaro, S.L. Wolchik, J.R. Wright, H. Harding, D. Shambaugh

Associate Professors C.F. Elliott, R.W. Rycroft, C.J. Deering, H.B. Feigenbaum, J.H. Lehovic, R.P. Stoker, N.J. Brown, A. Bowie

Assistant Professors S.K. Sell, M. Finnemore, F. Maltzman, B. Dickson, P. Wahlbeck, D. Auerswald, J. Goldgeier, L. Zeng, D.D. Avant, S.J. Balla, L. Creppell, J. Willson-Quayle

Master of Arts in the field of political science—Prerequisite: a bachelor's degree from an accredited college or university, or an equivalent degree, and high undergraduate scholastic standing.

Required: The general requirements stated under Columbian School of Arts and Sciences; a research tool; and a general examination in a primary field. The research tool may be a reading knowledge of a modern foreign language, a specified level of knowledge in statistics, or two graduate-level courses in a cognate discipline. Students prepare for general examinations by taking at least six courses selected according to departmental guidelines in their chosen field. Five fields of concentration are available: American politics and government, international relations, comparative and foreign politics, political theory, and public policy. Students are required to take at least two courses outside of their primary field of concentration. Students may elect one of the following programs: (1) 30 credit hours of graduate course work, including PSc 299–300, and the satisfactory completion of a master's thesis, or (2) 33 credit hours of graduate course work without a thesis.

Doctor of Philosophy in the field of political science—Students of outstanding ability are admitted to the doctoral program upon recommendation of a departmental graduate committee and the concurrence of the Columbian School.

Required: The general requirements stated under Columbian School of Arts and Sciences; two research tools; a General Examination covering both a primary and secondary field; and a dissertation demonstrating the capacity to undertake original and significant research. The research tools may be selected from reading knowledge of a modern foreign language, a specified level of knowledge in statistics, or two graduate-level courses in a cognate discipline. Students prepare for the General Examination by taking at least six courses in their primary field and at least four courses in their secondary field, selected according to departmental guidelines. Five primary fields are available: American politics and government, international relations, comparative and foreign politics, political theory, and public policy. In addition, research methodology is available as a secondary field.

PSy 201 and 202 are required of all students unless they demonstrate knowledge of the course subject matter by passing a waiver examination.

General examinations are given three times per year. Students may take both their primary and secondary field examinations during the same testing period, or they may take them in successive semesters. The examination in the primary field entails both a written and oral component.

A recommendation to the dean for admission to the second unit, or dissertation research stage, will be considered upon satisfactory completion of all course work, tool requirements, field examinations, and submission of an approved dissertation prospec-

tus. Admission to the second unit is permitted only if the student's performance on the examinations and in the course work gives a good indication of success in the second unit. Passing the field examinations does not in itself ensure admission into the second unit.

The dissertation prospectus must outline the central research question(s), relate the proposed research to the existing literature, detail a research methodology, and explain the nature of the original contribution that the completed project will provide. The prospectus must be presented and defended in an open forum, which all faculty and doctoral students are invited to attend.

A course sequence in political psychology is available to students in the political science program.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

201 Introduction to Political Analysis (3) Wahlbeck, Zeng
Alternative approaches to political analysis, construction of research designs and problems of measurement. Laboratory fee, $20. (Fall and spring)

202 Empirical Political Analysis (3) Wahlbeck, Zeng
Techniques of social science data analysis, with emphasis on statistics and computer applications. PSc 201 or other previous introductory research training is highly desirable. Laboratory fee, $20. (Spring)

203 Approaches to Public Policy Analysis (3) Stoker, Balla
Empirical and normative foundations of systematic policy analysis: concepts, theories, models, issues, strengths, limitations, and uses and misuses in the policy process. (Fall)

204 Methods of Public Policy Analysis (3) Stoker, Balla
Quantitative and qualitative techniques of systematic policy analysis, such as forecasting, cost–benefit analysis, simulation, operations research, social indicators, and quasi-experimental methods. Prerequisite: PSc 203 or equivalent. (Spring, alternate years)

205 Readings in Political Theory (3) Linden, Creppell
Selected major works, both ancient and modern, that illuminate basic problems and questions of political theory. (Fall)

206 Topics in Political Theory (3) Linden, Creppell
Advanced readings and group discussions. Analysis and interpretation of selected concepts and schools of thought. (Spring)

207 Modern Political Thought and Ideologies (3) Linden
Analysis of some main currents in modern political thought and ideologies. (Fall)

208 Russian Political Thought (3) Elliott, Linden
Analysis of contemporary Russian political thought and its antecedents. (Spring)

210 American Political Process (3) Deering, Maltzman, Wright (Fall)
A survey of American political institutions, processes, and behavior.

211 State and Urban Politics (3)
Comparative analysis of the context, institutions, processes, and policies of state and urban political systems. (Alternate years) Hero

212 State and Urban Policy Problems (3)
Analysis of public policy issues confronting state and urban governments, with emphasis on the theoretical roots and empirical impact of past and present programs in such areas as housing, education, poverty, and crime. (Alternate years) Wahlbeck

213 Judicial Politics (3)
Introduction to the literature of judicial process and behavior studies, with focus on selected topics. Emphasis on the major subfields of law, courts, and judicial process. Wahlbeck

214 Topics in Constitutional Law (3)
Lectures and group discussions on constitutional law and politics. Wahlbeck

215 Judicial Policymaking (3)
Role of the judiciary in policy formulation; emphasis on the U.S. Supreme Court and civil liberties issues.

216 **American Presidency** (3) Maltzman
Personalized and institutionalized aspects of the presidency with particular emphasis on the politics of contemporary policymaking.

217 **Executive Branch Politics** (3) Rycroft, Balla
Structure and operation of governmental bureaucracy with particular emphasis on the politics of formulating and implementing public policy.

218 **Legislative Politics** (3) Deering, Wright, Maltzman
Theory, structure, and process of the U.S. Congress, with emphasis on member–constituency relations, individual and collective decision making, party and committee activities, executive–legislative relations, and interest-group activities.

219 **American Political Parties and Elections** (3) Wright
Nature and functions of American political parties: organizational status, nominating and electoral politics, and role in governing. (Alternate years)

220 **Public Opinion and Political Socialization** (3) Staff
Sources and dynamics of public opinion and political socialization. Same as PPSy 203.

221 **Interest-Group Politics** (3) Deering, Wright
Theory, structure, and activities of interest groups in American politics.

222 **Executive–Legislative Relations** (3) Staff
Political and institutional relationships between the executive and legislative branches of the federal government. Offered off campus only.

224 **Domestic Policy Analysis—Selected Topics** (3) Balla
Analysis of U.S. policy toward selected domestic problems.

225 **Budgetary Policy** (3) Staff
Analysis of selected topics in U.S. monetary and fiscal policy. Offered off campus only.

226 **Budgetary Politics** (3) Staff
Examination of economic policymaking in the United States, with emphasis on major participants and the budget process. Offered off campus only.

228 **Media and Politics** (3) Staff
Role of the media in American politics, with emphasis on television news coverage, political debates, political advertising, and their impact on the electorate.

229 **Politics and Public Policy** (3) Stoker, Henig, Balla
Examination of political processes that influence policy formulation, policy implementation, and the uses of policy analysis.

230 **Comparative Government and Politics** (3) Kim, McClintock, Feigenbaum, Dickson, Bowie
Examination of basic approaches to comparative politics. (Fall and spring)

232 **Communism and Democratization** (3) Sodaro
Comparative analysis of transitions to democracy in communist and post-communist systems, with applications of democratic theory. (Fall)

234 **Comparative Legislative Systems** (3) Staff
Selected problems of legislative theory and behavior from a comparative perspective, with particular reference to the parliamentary systems of Germany, France, and Britain. Offered off campus only.

238 **U.S. Foreign Economic Policy** (3) Nau
Exploration of ideas and issues involved in U.S. foreign economic policy, including relationship of economic and security issues, interdependence, protectionism, role of the dollar, industrial policy, and the debt crisis. (Fall)

239 **International Political Economy** (3) Sell, Nau
Research seminar exploring alternative theoretical approaches to the study of international political economy and their application to the explanation and interpretation of historical and contemporary events in world political and economic affairs. (Spring)

240 **International Politics** (3) Lebovic, East, Sell, Finnemore, Nau, Auerswald, Avant
Open to Elliott School students only. Theories of international relations. (Fall and spring)

241 **Theories of International Politics** (3) Lebovic, East, Sell, Finnemore, Nau, Auerswald, Avant
Advanced theories of international relations. (Fall)

242 **Politics and Practice of International Institutions** (3) Finnemore
The politics of international institutions in the areas of collective security, peace keeping, trade, money, development, environment, human rights. (Fall)

243 **Theories of International Cooperation and Organization** (3) Finnemore
Theoretical approaches to international cooperation and organization from economics, sociology, political science, and organization theory. (Spring) Smith

244 **Politics of International Law** (3)
The political sources and consequences of international law and norms. (Fall) Smith

245 **Selected Topics in International Law** (3)
Readings and research on selected topics related to the legal framework of international politics. (Spring) Auerswald

246 **U.S. Foreign Policy** (3)
Patterns and problems in contemporary U.S. foreign policy. Special attention given to the domestic political factors shaping foreign policy.

247 **U.S. Foreign Policy After the Cold War** (3) Auerswald, Ne
Contemporary debate about the substance of American foreign policy in the post-Cold War world through the lens of alternative theoretical approaches to the study of international relations. Classical realist (national interest), neo-realist (balance of power), neoliberal (international interdependence and institutions), and constructivist (national identity) interpretations are compared.

248 **Politics of U.S. National Security Policy** (3) Auerswald, Avant
Examines competing theoretical approaches to the study of national security policy and tests these on a variety of substantive issue areas in the United States. (May include such topics as nuclear non-proliferation, responses to new conflicts, definition of new security goals, etc.)

249 **International Security Politics** (3) Avant, Goldgeier
The major theoretical debates in the field of international security. Topics include the causes of war, civil–military relations, deterrence, arms control, alliance formation, crisis management, technological dependence, ethnicity, migration, and environmental degradation. Staff

250 **Foreign Policy Analysis—Selected Topics** (3)
Analysis of U.S. foreign policy toward selected world regions. Staff

257 **Arms Control and Disarmament** (4)
Major issues and trends in the postwar development of U.S. arms control and disarmament policy. (Spring) Feaver, Avant

260 **Western European Politics** (4)
Examination of the principal characteristics of the British, French, German, and Italian political systems, comparing their institutional and behavioral adaptations to the problems of advanced industrial democracies. (Fall) Staff

261 **Politics of European Integration** (4)
The origins, institutions, and politics of West European integration with emphasis on theories of regional integration and the development of the European Union. Feigenbaum, Staff

262 **The Political Economy of Western Europe** (4)
An examination of the relationships between economic interests and political power as they affect the societies of Western Europe. Selected issues of public policy are discussed. (Spring) Staff

263 **Russia and Europe** (3)
Russia's role in post-Cold War Europe, focusing on economic and security relations throughout the region and on domestic–foreign policy linkages in the former USSR, Eastern Europe, and Western Europe. (Fall) Wolczuk

264 **Comparative Governments and Politics of Eastern Europe** (3)
Comparative analysis of domestic political processes and policies in Eastern Europe. (Fall) Wolczuk

265 **The International Politics of Eastern Europe** (3)
Major historical, political, social, and regional factors that have shaped the interwar, World War II, and postwar evolution of Eastern Europe; emphasis on foreign relations with outside powers and on regional East–West contacts. (Spring) Rachwald

266 **Government and Politics of the USSR** (3)
Seminar on Soviet domestic government and politics, treated historically (1917–1991). (Fall)

267 **Soviet Government and Politics** (3) Elliott, Landen, Reddaway
Research seminar in selected problems of Soviet domestic government and politics. Emphasis: since Stalin. Prerequisite: PSc 266 or permission of instructor. (Spring)

268 **Post-Soviet Foreign Policies** (3) Elliott
External problems and policies of Russia and the other successor states of the former USSR (especially the Baltics, Ukraine, and southern rim of the former Soviet Union). (Spring)

269 **Post-Soviet Military Policies** (3) Elliott
Contemporary military problems and policies in Russia and the other successor states of the former USSR (especially Ukraine). (Fall and spring)

270–71 **Politics of China** (3–3) Dickson, Shambaugh, Harding
PSc 270: Readings and discussion of the political dynamics and policy process in contemporary China. PSc 271: Research seminar on selected topics in Chinese politics, using official and other primary sources. Prerequisite to PSc 271: PSc 270 or permission of instructor. (Academic year)

272 **Foreign Policy of China** (3) Dickson, Shambaugh, Harding
Readings and research on the main approaches to analyzing China's foreign policy and foreign relations. (Spring)

274 **Governments and Politics of Japan and Korea** (3) Kim
Readings and research on the domestic and foreign policies of Japan and North and South Korea. (Fall or spring)

275 **International Politics of East Asia** (3) Kim
Foreign policies and international behavior of the regional states (especially China, Japan, and Vietnam) and the extraregional powers (especially the U.S. and Russia). (Spring, odd years)

276 **The Arab–Israeli Conflict** (3) Reich
Readings and research on the origins, evolution, and issues of the Arab–Israeli conflict. (Spring)

277 **Comparative Politics of the Middle East** (3) Reich, Brown
Readings and research on selected problems of the governments and politics of the Middle East. (Fall)

278 **International Relations of the Middle East** (3) Reich, Brown
Readings and research on the regional and international relations of the Middle East. (Spring)

279 **The Powers in the Middle East** (3) Reich
The role of the powers in the Middle East, with emphasis on the policies of the United States and the Soviet Union. Consideration is given to other major European and Asian powers. (Fall)

280 **Governments and Politics of North Africa** (3) Reich
Readings and research on selected problems in the governments, politics, and international relations of North Africa. (Fall)

281 **Topics in African Politics** (3) Staff
Readings, research, and discussion of selected aspects of African domestic and international politics. (Fall)

283 **Comparative Politics of Latin America** (3) McClintock
Readings and discussion on the politics of selected countries in South America, Central America, and the Caribbean. Emphasis on the possibilities for democracy and revolution. (Fall)

284 **International Relations of Latin America** (3) McClintock
Readings and discussion on U.S.–Latin American relations and the foreign policies of selected states. (Spring)

285 **Selected Topics in Empirical Analysis** (3) Wright, Zeng
Advanced techniques of data collection and analysis, varying emphasis on such methods as causal modeling, analysis of variance, regression analysis, and simulation. (Offered as the demand warrants)

286 **Selected Topics in American Politics** (3) Staff
In-depth coverage of significant theoretical and empirical issues in American politics, including such topics as political behavior, electoral politics, and race and politics. For advanced students. (Offered as the demand warrants)

287 **Selected Topics in Political Theory** (3) Staff
In-depth coverage of significant issues in political theory, including such topics as justice, toleration, and political community. For advanced students. (Offered as the demand warrants)

288 **Selected Topics in Comparative Politics** (3) Staff
In-depth coverage of significant theoretical and empirical issues in comparative politics, including such topics as democratization, the politics of development, the role of the state in advanced industrial societies, gender and ethnicity, and the politics of nationalism. (Offered as the demand warrants)

289 **Selected Topics in International Politics** (3) Staff
In-depth coverage of significant theoretical and empirical issues in international politics, including such topics as comparative foreign policy, ethics and norms in international politics, the politics of military intervention, and theories of security in a post-Cold War environment. For advanced students. (Offered as the demand warrants)

297 **Reading** (3) Staff
Limited to master's degree candidates. Written permission of instructor required.

298 **Research** (3) Staff
Limited to master's degree candidates. Written permission of instructor required.

299–300 **Thesis Research** (3–3) Staff

397 **Advanced Reading** (3) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

398 **Advanced Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

PROFESSIONAL PSYCHOLOGY

Professor J.C. Miller (*Director*)
Professorial Lecturer D.E. Holmes
Associate Professors P.A. Jennings, L.J. Ingraham (*Research*), R.C. Fritsch
Assistant Professors M.D. Jasnow, C.E. Parks, Y.E. Alechina, B.L. Welch
Assistant Professorial Lecturers E.B. Fritsch, K.R. Miller, E.C. Klossen, M.L. Wylie

Clinical Training Staff

Clinical Professor J. Borriello
Assistant Clinical Professors M. Harris, P.L. Ellman, D.E. Cooper, Q. Graham, C. Verghese

Through the Center for Professional Psychology, Columbian School of Arts and Sciences offers the degree of Doctor of Psychology.

Doctor of Psychology in the field of clinical psychology—Prerequisite: the degree of Bachelor of Arts with relevant background and experience in psychology or its equivalent. Students who lack adequate preparation will be expected to complete prerequisite undergraduate courses during the first year of the program; credit for such courses does not apply to the degree.

Required: the general requirements stated under Columbian School of Arts and Sciences. The three-year program includes the core curriculum (PsyD 201–2, 204–5, 206, 207, 209, 220–21, 225–26, 227), seven courses chosen from two tracks—four from a designated major and three from a designated minor—as indicated in the listing given below, satisfactory completion of the General Examination in the core and major areas of study, and the completion of 15 practicum credits through registration for PsyD 263 for each semester and summer of the program.

A one-year, full-time internship at an institution approved by the program faculty is required for completion of the degree program.

Tracks: Psychodynamic psychotherapy (the PsyD 230s), community psychology (240s), diagnostic assessment (250s), child therapy (260s).

Note: The full intended curriculum is listed below; although not all listed courses will be offered until the third year of the program. PsyD courses are limited to students enrolled in the Center for Professional Psychology except by permission of the director of the Department of Psychology for the degree program leading to the Doctor of Philosophy in the field of clinical psychology.

201–2 **Psychological Assessment** (3–3)
A two-semester sequence on cognitive and projective testing, focusing on core batteries used in intellectual and personality assessment.

203 **Practicum in Clinical Psychology** (1 to 3)
A continuing practicum, repeated in each semester and summer of the program's three years. One credit each in the fall and spring, three credits in a summer session. In year one, focused on psychological assessment, in upper years, on psychological intervention related to the student's choice of tracks.

204 **Biological Basis of Clinical Psychology** (3)
The structure and function of the nervous system and its application to understanding psychopathology. Development of the nervous system in interaction with learning and experience as a central basis of human growth and disability.

205 **Psychodynamic Psychopathology** (3)
The developmental psychodynamic basis for understanding psychopathology, with comparisons to relevant biological and social explanatory factors.

206 **Cognitive Basis of Clinical Psychology** (3)
The theoretical and experimental basis of learning, memory, and cognition. Cognitive growth, maturation, and learning. Cognitive development in relation to adaptive and maladaptive resolution of conflict.

207 **Group and Organizational Dynamics** (3)
Social aspects of adaptive and maladaptive dynamic patterns, group structure and the individual, shared unconscious ideas in wish and defense, small, large, and intergroup (community) dynamics and intervention.

209 **Statistics and Research Design** (3)
The role of measurement, design, and statistics in clinical psychological research; basic descriptive and inferential statistics; analysis of variance and multivariate designs; case study designs, clinical field research, process analysis.

220–21 **Psychodynamic Psychotherapy** (3–3)
A one-year course on psychodynamic theory, technique, and research relating to individual psychotherapy. Readings in Fenichel, Brenner, Kohut, Klein, Perls, Rogers. Recent developments in theory and technique. Professional ethics.

225 **Ego Psychology** (3)
An introduction to modern ego psychology: from Freud and Hartmann to Anna Freud, Brenner, Sandler, Abend, Arlow.

226 **Object Relations Theory** (3)
A historical survey of object relations theory, from Klein, Fairbairn, Winnicott to Bion, Kernberg, Mahler, Jacobsen, Kohut.

227 **History and Systems of Clinical Psychology** (3)
A review of the historical development of clinical psychology: its roots in mainstream psychology and psychiatry; its modern technical and theoretical systems.

230 **Recent Developments in Technique** (3)
Current topics and controversies in psychotherapy technique. Readings in Gill, Ross, Brenner, Arlow, Gray, Schwaber, Stone, Etchegoyen.

231 **Short-Term Psychotherapy** (3)
A study of brief psychodynamically oriented psychotherapy interventions. Focus on clinical vignettes, readings in Werman, Davanloo, Sifneos, and others.

232 **Character Pathology: Theory and Technique** (3)
Recent contributions to the understanding of character pathology and its implications for treatment. Readings in Kernberg, Kohut, Abend, Porder and Wallack, Klein, Bion, Winnicott.

233 **Issues in Gender Development** (3)
Studies of similarities and differences in male and female gender development. Recent theoretical and clinical contributions. Writings of Stoller, Blum, Tyson and Tyson, Galenson and Roiphe, Kleeman, Chassaguet-Smirgel.

234 **The Nature of Therapeutic Action** (3)
How therapy works to bring about change. The function of affect. The role of fantasy and the process of working through. Conflict and compromise in adaptive and maladaptive functioning.

240 **Group Psychotherapy** (3)
Theory and technique in group psychotherapy; history of group therapy and group analysis; current controversies in the field. Readings in Bion, Ezriel, Scheidlinger, Whitaker, Foulkes, Pines, Anzieu, Ganzarain

241 **Therapeutic Milieu and Community** (3)
The functions of group and organizational processes in psychological treatment in hospitals, clinics, therapeutic communities, and schools. History and current trends, including Edelson, Cummings, Jones, Main, Hinshelwood, Lofgren

242–43 **Psychology and Law** (3–3)
The psychological study of the legal process and the application of psychodynamic principles and findings in the legal process. Studies and interventions in the judicial and correctional systems; judge and jury studies; psychological testimony; corrections research and reform; working with special forensic systems and populations

244 **Cultural Factors in Psychopathology and Psychotherapy** (3)
The study of cultural forces as both cause and effect variables in psychopathology and psychotherapy. Cultural factors in resistance and transference. Readings in Kardiner, Srole, Dollard, Lerner, Holmes, Fischer.

245 **Advanced Group and Organizational Dynamics** (3)
For students interested in learning to conduct research or engage in consultation in groups and organizations. Advanced techniques of diagnosis, clarification and interpretation.

246 **Community Intervention** (3)
Theory and research in community mental health intervention. Work with community organizations on focal projects. Readings in Sarason, Goldenberg, Miller et al., Levinson, Kaplan.

250 **Neuropsychological Assessment** (3)
Theory and practice of neuropsychological assessment. History and development of the field. Major batteries, individualized approaches, and specialized tests

251 **Advanced Psychodynamic Assessment** (3)
Recent trends in projective testing: Lerner and Lerner, Schafer, Allison and Blatt, Kwawer, Sugarman, Exner

252 **Child and Adolescent Assessment** (3)
Case seminar with clinical presentations, focused on the core clinical battery. Problems of differential diagnosis between neuropsychological hypotheses and conflict-based hypotheses. Readings in Siegal, Ames, Rothstein, Rabin and Rabin, Hayworth, Sattler

253 **Geriatric Assessment** (3)
Assessment of syndromes affecting elderly populations, including dementia, anxiety disorders, depression, character pathology.

254 **Comprehensive Diagnosis** (3)
A summary course on comprehensive diagnosis in child, adult, and geriatric settings. Comparison of biological, social, and psychological factors in all areas of clinical psychological assessment. Prerequisite: Psyl) 250, 251, 252, 253, or their equivalents.

260–61 **Child Development** (3–3)
Cognitive and emotional factors in the development of normal and abnormal personality dynamics in children and adolescents: experiential and maturational aspects, learning disabilities, the development of conflict and compromise formations; the relevance of child development to adult psychodynamics and psychotherapy

262 **Child and Adolescent Psychopathology** (3)
Theory and research on child and adolescent psychopathology. The development of diagnostic categories and their relevance to psychodynamic considerations. Readings in Klein, A. Freud, Yorke, Sandler and Sandler, Garmezy, Stern, Mahler, Blos, Tyson and Tyson, Neubauer, Nagera

264 **Child and Adolescent Psychotherapy** (3)
Case seminar on child and adolescent treatment. Biological and psychological treatments; intensive vs. short term; conceptualizations of play therapy; differences from adult techniques. Readings in Sandler, Tyson and Kramer, A. Freud, Glenn

265 **Family Therapy** (3)
Survey of classical and modern theories of family structure and therapy. History and development of the field. Major schools and current controversies. Readings in Whitaker, Ackerman, Palazzoli, Bowen, Framo, Haley, Hoffman, Satir, Slipp.

266 **Clinical Intervention in Schools** (3)
Theory and practice of clinical psychological interventions in schools. Testing, observation, consultation. Readings in Newman, Sarason, Goldenberg, Kaplan.

270 **Current Topics in Clinical Psychology** (arr.)
May be repeated for credit provided the topic differs.

271 **Independent Study (arr.)**

272 **Continuing Case Seminar** (arr.)
May be repeated once for credit.

PSYCHOLOGY

Professors A.D. Kirsch, D.E. Silber, C.E. Rice, E. Abravanel, J. Miller, L.A. Rothblat, R.A. Peterson, J. Zendnet (*Research*), R.D. Caplan, P. Wirtz, D. Reiss, S.A. Karp, C.K. Sigelman, R.W. Holmstrom (*Chair*), G. Howe (*Research*), L.A. Lefton
Professorial Lecturer J.C. Shaft
Associate Professors P.I. Poppen, I. Brandt, L.R. Offermann, C.A. Rohrbeck, M.C. Zee, S. Dopkins, S.D. Molock
Adjunct Associate Professor C. Reisen
Assistant Professors J.M. Ganiban, D. Rohrer, D.P. Costanza, N. Frank, E. Peterson
Adjunct Assistant Professor K. Ross-Kidder
Assistant Professorial Lecturer C.M. Carney
Lecturer P.J. Woodruff

Clinical Training Staff

Clinical Professor J. Borriello
Associate Clinical Professors D.M. DePalma, R.L. Jenkins
Assistant Clinical Professors L.E. Moldauer, W.L. Scarpetti, C. Verghese, W.D. Fynan, Jr., M.B. Kaiser

Master of Arts in the field of psychology—Prerequisite: the degree of Bachelor of Arts with a major in psychology or an equivalent degree. Admission to the program is limited. Preference will be given those who plan to continue toward a Doctor of Philosophy degree. Required: the general requirements stated under Columbian School of Arts and Sciences. Of the 24 required credit hours (exclusive of the thesis), a minimum of 18 must be in the area of clinical psychology courses, including Psyc 202 and 203 or 204. 6 credit hours may be in related fields approved by the department. For detailed requirements consult the chair of the doctoral program committee.

Doctor of Philosophy in the field of psychology—Prerequisite: the degree of Bachelor of Arts with a major in psychology. Students whose academic preparation is in other disciplines will be expected to complete prerequisite undergraduate courses to prepare for graduate study in psychology before admission to the field.
Required: the general requirements stated under Columbian School of Arts and Sciences, including (1) Psyc 202, two graduate psychology courses outside the chosen field approved by the advisor, and appropriate statistics courses; and (2) the satisfactory completion of a first-year examination and the General Examination in the major area of study. For detailed requirements, consult the chair of the department or the chair of the doctoral program committee.
Fields: clinical, developmental, cognitive neuropsychology, industrial–organizational, and applied social psychology.

Courses at the 200 level are limited to graduate students in psychology, except by permission of instructor.

A course sequence in political psychology is available to students in psychology majors.

By permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs section for course listings.

202 **Psychological Research Methods and Procedures** (3) Caplan and Staff
Required in all graduate psychology programs. Includes philosophy of science, types of research design, and methods of data collection. Prerequisite: graduate standing, a laboratory course in psychology, and an elementary course in statistics.

203 **Experimental Foundations of Psychology: Learning, Memory, and Cognition** (3) Dopkins
Current conceptions of learning, memory, and cognition; the research upon which these conceptions are based; applications to practical contexts.

204 **Experimental Foundations of Psychology: Biological Basis of Behavior** (3) Rothbart
Introduction to the structure and function of the nervous system. Topics include neural communication, sensory processes, memory, neuroendocrinology of sex differences and stress, psychiatric and neurodegenerative disorders.

207–8 **Psychological Assessment** (3–3) Holmstrom, Silber, Staff
Open only to clinical graduate students in the Department of Psychology. Theoretical and clinical aspects of assessment; includes interviewing, psychometric tests, and projective techniques. Two-hour laboratory—diagnostic work at clinical facilities. Material fee, $30 per semester. (Academic year)

210 **Developmental Theories and Issues** (3) Staff
Orientation to the field of developmental psychology, with emphasis on traditional and contemporary theories, fundamental concepts and issues, and methodological approaches.

211 **Assessment of Cognitive Functioning** (3) Silber and Staff
Concepts of intelligence and achievement and their assessment through a variety of individual procedures. Material fee, $30. Admission by permission of instructor. (Summer)

212 **Personality Assessment by Projective Techniques** (3) Karp and Staff
Personality assessment: Rorschach, TAT, and other apperception methods. Material fee, $25. Admission by permission of instructor. (Summer)

213–14 **Seminar: Developmental Psychology** (3–3) Abravanel, Brandt
Psyc 213: research and theory in developmental psychology, with topics ranging from cognitive, perceptual, and language functioning development. Psyc 214: current research and theoretical issues in social and personality development in childhood and adolescence. (Academic year) Staff

215 **Psychodynamic Approaches to Child Assessment and Therapy** (3) Staff
A broad range of issues in child personality development will be considered with special focus on drives, interpersonal relations, defenses, intellectual capacities, and moral development. Admission by permission of instructor. Material fee, $25. (Fall) Gaensbauer

216 **Developmental Disabilities** (3)
Comprehensive introduction to the field of developmental disabilities. Origins, evolution, and long-term consequences of developmental disabilities. Genetic and biological origins of disabilities.

218 **Effective Interventions: Methods and Research** (3)
Introduction to theory and technique of psychotherapeutic approaches of proven effectiveness. (Spring and summer) Staff

219 **Group Dynamics** (3)
Relationship of the individual to groups, collectivities, and larger social systems. Theory, research, and applications of group and organizational processes, emphasizing contributions of Freud, Bion, Slater, Miller and Rice. Opportunity is provided to attend a group dynamics workshop, which is recommended but not required. Enrollment limited. (Spring) Staff

220 **Seminar: Abnormal Psychology** (3) Staff
Study of selected problems of psychopathology. (Fall)

221–22 **Seminar: Group Psychotherapy** (3–3)
For graduate students in the clinical psychology program. Open to others if space permits and with permission of instructor. Psyc 221: Survey of group therapy approaches; Psyc 222: Supervised experience with therapeutic groups. Prerequisite to Psyc 221: Psyc 219. (Alternate academic years) Staff

223 **Seminar: Human Memory** (3)
Selected topics of current research interest in the area of human memory. Emphasis on encoding and retrieval processes, amnesia, and disorders of memory.

225 **Behavioral Approaches to Child Assessment and Therapy** (3) Rohrbeck
Child assessment and treatment from a behavioral viewpoint. The application of conditioning, reinforcement, and shaping principles with reference to specific disorders of childhood.

226 **Seminar: Clinical Psychology of Childhood and Adolescence** (3) Brandt
For graduate students in psychology, open to others with permission of instructor. Exploration of major topics concerning psychopathology in children and adolescents, discussion of nosological issues with emphasis on theoretical and research literature.

227–28 **Seminar: Principles of Psychotherapy** (3–3) Staff
For graduate students in clinical psychology; open to others with permission of instructor, if space permits. Patient's needs and demands on the therapist. Case participation heavily relied upon. Prerequisite, Psyc 218. (Alternate academic years)

229 **Seminar: Principles of Behavior Change** (3) R. Peterson
Behavioral learning methods and theory applied to clinical problems. (Fall)

231 **Development of Psychometric Instruments** (4) Staff
Quantitative techniques and principles used in construction, standardization, and evaluation of personality and ability measures for research and practice; quantification of human judgment for measurement purposes. Prerequisite: course in tests and measurements and an elementary course in statistics. (Fall)

232 **Ego Psychology and Theories of Object Relations** (3) Holmstrom
For graduate students in clinical psychology; open to others with permission of instructor. Examination of psychodynamic ego psychology, object relations theories, and self psychology. Emphasis on formulations of characterological disorders, including borderline and narcissistic syndromes. (Spring)

235 **Seminar: Community Psychology** (3) Rohrbeck
For graduate students in the Department of Psychology; open to others, with permission of instructor, only if space permits. Survey of issues and techniques in community psychology; emphasis on educational systems and community psychology issues.

236 **Seminar: Minorities and Mental Health** (3) Zea
Factors affecting the mental health of minorities. Treatment considerations and differences in theoretical approaches with respect to minorities. (Spring)

237–38 **The Practice of General Psychology** (3–3) Staff
Application of psychological principles and findings to a wide spectrum of human problems. Professional issues facing the psychologist offering services. Participation in the development, implementation, and evaluation of applied psychological services and projects. (Academic year)

240 **Psychopathology** (4) Silber
Research and theory in psychopathology. (Fall)

241–42 **Family Systems: Theory, Practice, and Research** (3–3) Howe
Family dynamics and their implications for assessment and treatment. Special emphasis on the role of research in the process of evaluation of family systems and family therapy. Enrollment limited to advanced doctoral students in clinical psychology. (Academic year)

243 **Psychoanalytic Theory and Research** (4) Holmstrom
Introduction to psychodynamic theory and research, with emphasis on current developments in modern psychodynamic theory, and the application of current formulations to the understanding and treatment of psychopathology.

244 **Theories and Processes of Organizational Management** (3) Staff
Basic functions and techniques of organizational management—design, control, direction, and decision making—examined from the viewpoint of behavioral science.

245 **Seminar: Organizational Behavior** (4) Offermann
Analysis of organizational behavior, emphasis on motivation and productivity. Recent research on employee attitudes, primary group, supervisory leadership, formal and informal organization, job design. (Fall)

246 **Seminar: Personnel Evaluation Techniques** (4) Staff
Techniques of personnel selection and performance evaluation. Employment tests, personal data, assessment interviews, performance ratings, and assessment

centers. Consideration of federal guidelines in employee selection. Includes practicum.

247 **Seminar: Psychology of Leadership in Organizations** (3) Offermann
Theories and issues related to the emergence and effectiveness of leaders, with focus on leadership behaviors and processes in organizations.

248 **Research Applications to Organizational Intervention and Change** (3) Staff
Emphasis on development of models of organizational effectiveness; design of valid diagnostic instruments; implementation of research strategies; establishment of program evaluation criteria. (Fall)

251 **Behavioral Neuroscience** (3) Rothblat
The neural basis of behavior, with special focus on the psychobiological determinants of learning, memory, and cognition. Methodologies used for different levels of analysis with normal and brain-impaired subjects.

253 **Social Cognition** (3) Staff
Social psychology theories, conceptual approaches, and their applications. Social cognition, person perception, attribution, information processing, attention, stereotyping.

254 **Social Influence** (3) Offermann
Social psychology theories, conceptual approaches, and their applications. Analysis of intentional and unintentional social influence processes and their effects on behavior. Current research on conformity, social power, social exchange, and impression management.

255 **Attitudes and Attitude Change** (3) Popper
Current theory and research on attitudes and attitude change.

256 **Introduction to Survey Research** (3) Poppen, Capitanio
Theory and practice of face-to-face telephone and mail surveys. Practical experience with all stages from the formulation of research questions and hypotheses to questionnaire design, sampling, pilot, testing, interviewing, coding, and data cleaning. Prerequisite: Stat 105 or equivalent. (Fall)

257 **Current Topics in Social Psychology** (3) Poppen, P. Peterson
Advanced seminar with focus on major theoretical approaches, research, and problem areas within field of social psychology. Topic changes each semester. (Fall and spring)

259 **Psychology of Individual and Group Decision Making** (3) E. Peterson
Examination of processes in organizational decision making and group behavior for the practical manager. Topics include managerial style and decision making, group and individual decision-making approaches, decision aids and support systems, performance and decision effectiveness, and risk analysis.

260 **Psychology of Work Group Development** (3) Offermann
Examination of theory and research on groups as task performance systems. Approaches to team development as a means of improving work group effectiveness, including goal setting, role clarification, increasing interpersonal skills, and conflict resolution. (Spring)

263 **Evaluation Research** (3) Kraus
Research issues and methods in evaluating the impact of organizational and social intervention and service programs. Specification of program goals and effectiveness criteria; measurement problems; experimental and quasi-experimental designs; political problems surrounding evaluation research. (Spring, even years)

268 **Seminar: Neuropsychology** (3) Kraus
Selected problems in research relating the brain and behavior. Independent topics each semester, such as sensory processing, brain development and recovery, clinical aspects of nervous system function.

277 **Health Psychology** (3) Poppen, Capitanio
Social and psychological theories and research that relate to health maintenance. Application of theories of social learning, attribution, attitude change, and social influence to topics such as health promotion and disease prevention, patient compliance, and coping with illness and disability.

278 **Behavioral Medicine** (3) E. Peterson
The psychological causes, outcomes, and treatments for a wide variety of medical illnesses. Examination of research on the effectiveness of programs designed to promote health, to encourage compliance, and to foster behavior changes.

279 **Special Topics in Health Psychology** (3) Staff
A comprehensive review of a special topic area within health psychology. Topics change each semester. May be repeated for credit. Admission by permission of instructor.

281 **Clinical Neuropsychology I** (3) Rothblat
Analysis of experimental and clinical findings from studies attempting to localize and interpret human brain dysfunction, with emphasis on perceptual and cognitive behavior. Topics include overviews of neuroanatomy and neurological techniques, theoretical consideration of major neuropsychological disorders. Admission by permission of the instructor.

282 **Clinical Neuropsychology II** (3) Staff
Examination of important psychological procedures for the assessment of human brain dysfunction. Instruments and batteries such as the Bender-Gestalt, Wechsler Adult Intelligence Scale, Halstead-Reitan Neuropsychological Battery, and Luria's Neuropsychological Tests. Prerequisite: Psyc 211, 212, 281, and permission of the instructor.

287 **Current Topics in Clinical Psychology** (3) Staff
Advanced seminar with focus on major theoretical approaches, research, or problem areas. Topics vary. May be repeated for credit.

288 **Current Topics in Industrial/Organizational Psychology** (3) Staff
Advanced seminar with focus on major theoretical approaches, research, or problem areas. Topics vary. May be repeated for credit.

289 **Seminar: Current Topics in Experimental Psychology** (3) Staff
Review and discussion of contemporary research and theory in a specialized field of psychological study, by leaders in the field. Independent topics each semester, may be repeated for credit. (Fall and spring)

291 **Theories of Organizational Behavior** (3) Caplan
Examination of current theoretical models and research. (Spring)

295 **Independent Research** (1–3) Staff
Individual library or experimental research under supervision of staff member. Arrangements must be made with sponsoring faculty member prior to registration. May be repeated for credit.

296–499 **Thesis Research** (3–3) Staff

Advanced Reading and Research (arr.) Staff
Limited to students preparing for the Doctor of Philosophy major field examination. May be repeated for credit.

499 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

PUBLIC ADMINISTRATION

Professors S.R. Chatwood, M.M. Harmon, S.J. Tolchin, W.C. Adams, B.L. Catron, S.J. Levine, Professors K.E. Newcomer (*Chair*), B.T. Pitsvada, J.E. Kee, C.J. McSwain
Associate Professors J.F. Kasle, D.S. Cropp
Assistant Professor M. Moser

Seattle School of Business and Public Management for programs of study leading to the degrees of Master of Public Administration and Doctor of Philosophy.

211 **Public Administration and Management: Part I** (4) Harmon, McSwain
An introduction to the important historical issues in the formation of the field of public administration and the American social/political context of its development. Focus upon traditional management roles, linked to central normative concerns of the field. (Fall)

301 **Research Methods and Applied Statistics** (3 or 4) Adams, Moser, Newcomer
Development of skills and knowledge for conducting original research and critically evaluating empirical studies. Various research designs and data collection techniques are examined. Focus on computerizing data sets for quantitative analysis, analyzing strength of relationships, selecting appropriate statistical techniques, and testing statistical hypotheses. (Fall)

321 **Federal Policy, Politics, and Management** (2 or 4) Tolchin
Critical analysis of the structure and administration of the federal government from both a managerial and political perspective. Emphasis on executive branch organization, delegation, and coordination, as well as current trends in government regulation, accountability, and effectiveness. (Fall and summer)

204 **Public Administration and Management: Part II** (3) Harmon, McSwain
Aspects of organizational and management practice, including issues of improvement/excellence, employee development and evaluation, small-group team work, and efficiency/effectiveness/accountability as applied to public administration. (Spring)

205 **Public Budgeting, Revenue, and Expenditure Analysis** (3 or 4) Kee, Moser, Pitsvada
The empirical basis and procedural techniques of public budgeting, expenditure analysis, and revenue raising at all levels of government. Managerial and administrative implementation of major public programs from the standpoint of economic allocation and distribution. (Spring)

206 **Policy Analysis and Evaluation** (3) Catron, Moser, Newcomer
Analysis and evaluation of two complementary ways of assessing public policy. evaluation, which assesses how effectively goals are accomplished, and analysis, which anticipates the likely future consequences of adopting particular policy options. Consideration of the appropriate uses and limits of policy analysis and evaluation in the U.S. policy process. (Fall)

207 **Law and the Intergovernmental System** (2 or 3) Cropp, Kasle
A consideration of federalism, broadly defined as the distribution of power between the federal and state governments. Sections of the U.S. Constitution that give rise to federalism and the Supreme Court opinions that support that doctrine; powers conferred by the Constitution on the federal and state governments. (Fall and summer)

208 **Public Administration and Management: Part III** (2) Harmon, McSwain, Kasle, Sanders
A practicum course enabling students to apply material from PAd 201 and 204 to the practice of public administration. Students with less than three years of administrative work experience will be required to participate in a supervised internship, while those with professional experience may choose an alternative format. Prerequisite: PAd 201 and 204. (Fall, spring, and summer)

209 **Public Administration and Management: Part IV** (2) Harmon, McSwain, Sanders
Review of the diverse concepts and issues in public administration; analysis and integration of ethical, political, economic, managerial, and personal values and issues in the field. Open only to M.P.A. degree candidates in their final semester of study; serves as a capstone seminar to the M.P.A. program. Prerequisite: PAd 208. (Spring)

212 **Legislative Management and Congress** (3) Tolchin
Analysis of Congress as a management system; examination of its internal administration and its role in formulating policy through legislation. Executive-legislative relationships, staffing practices, budget processes, leadership styles and procedures, oversight functions, and the management of foreign policy are examined. (Fall)

214 **U.S. Competitiveness in the Global Economy—Trade and Investment Policy** (3) Tolchin
Analysis of U.S. competitiveness in the postindustrial era focusing on the political economy of the U.S. in comparison with Western Europe and Japan. Emphasis on technology transfer, trade and investment policies, the state of the manufacturing sector, fiscal and monetary policy, and the role of government. Chitwood, Kasle

215 **Law and the Public Administrator** (3) Tolchin
Exploration and analysis of the functions of law in a democratic society. Emphasis is placed upon the procedural, historical, and jurisprudential dimensions of American law. This broad perspective seeks to convey understanding of the law as a legal and moral force guiding and constraining public decision-making. (Spring)

216 **Federal Government Regulation of Society** (3) Tolchin
Analysis of the federal regulatory process as it affects the public and private sectors. Specific problems involving presidential management, policy analysis, reform efforts, legislative oversight, and economic deregulation are emphasized. (Spring)

217 **Seminar: Development Administration I** (3) Tolchin
The nature of program development and implementation. Specific organizational and management problems of less developed countries. National, cultural, and

political context. The giving of assistance: types of technical aid; problems of working with aid givers, analytical methods. (Fall)

218 **Seminar: Development Administration II** (3) Staff
The transfer of administrative capability from one country to another. Political and administrative development theories. The role of innovation. Strategies of institutional development. Organization of natural resource management. (Spring)

221 **Organization Theory and the Public Sector** (3) Harmon
Analysis of organization theory with special focus on public organizations, current issues in organization theory, decision making; the organizational environment and the changing nature of organizations in a postindustrial society. (Fall and spring)

223 **Behavioral Factors in Complex Organizations** (3) McSwain
Analysis of the nature and characteristics of human behavior in public organizations. Approaches to management and behavior in public organizations, small groups and teams. (Fall and spring)

224 **Managerial Leadership in Complex Organizations** (3) Chatwood, Kee
What the manager must know and do to provide leadership and guidance in large, complex organizations. An exploration of factors and processes that condition effective executive and managerial leadership. (Spring)

225 **Ethics and Public Values** (3) Catron
Ethical dimensions of personal and professional judgments of public officials. Cases are used to consider the ethos of public organizations and the moral foundations of public policy. (Fall)

242 **Managing State and Local Governments** (3) Cropp
Examination of state and local governmental structures and functions, their place within the federal system, their revenue sources, their limitations, and the alternatives available to encourage more effective administration to meet public and private demands. (Fall)

248 **Financing State and Local Government** (3) Kee
Analysis of the theory and practice of public finance in state and local governments. Includes the financing of services through municipal taxation, intergovernmental funds, debt instruments, and other revenue sources. Review of expenditures as well as financial management practices. (Spring)

249 **Urban and Regional Policy Analysis** (3) Cropp
Examination of selected national policies and their effects on urban areas and governments. Emphasis on policy dimensions of urban systems and their relationship to the social, political, and economic context. Against the background of urban politics and administration, areas of health, education, welfare, manpower, transportation, and housing are addressed. (Spring)

251 **Governmental Budgeting** (3) Pitsvada
Survey of the actors, institutions and processes in the U.S. budgeting system. Executive budget preparation-execution, legislative review and approval of budget requirements, and independent audit of government spending. Interrelationships of strategic planning, program development and evaluation, and budgeting at federal and state levels. Statutory bases of budgeting. (Fall)

253 **Financial Management in the Public Sector** (3) Pitsvada
Intensive analysis, using the case study approach, of concepts and principles used in the not-for-profit sector for financial management purposes. Disciplines of accounting, budgeting, operations control, management, and auditing are integrated into comprehensive management control systems and include issues of system design and implementation. (Spring)

254 **Seminar in Public Budgeting and Tax Policy** (3) Pitsvada
Advanced seminar dealing with current worldwide budget and tax policy issues. Focus on student research projects that demonstrate detailed understanding of financial issues as they relate to recent fiscal trends and proposals included in current budgets and revenue codes. Evaluation of tax regimes and budgeting policies, procedures, and processes.

260 **Policy Formulation and Administration** (3) Staff
Impact of economic and political factors on public policy formulation and implementation; intensive analysis of the analytical, normative, and decision-making models of the policy process with special emphasis on their relationship to current policy problems. (Fall and spring)

264 **Public Program Evaluation** (3) Newcomer
Theory and practice of program evaluation and evaluative research. Explorati... of scope and limitations of current practice in evaluation, considering ... nomic, political, social, and administrative factors. Examination of metho... ological considerations for design, data collection, analysis, and dissemina... (Spring)

267 **Cases in Public Policy** (3) Catron
Critical analysis of topical issues in public policy, using a case-study approa... Specific issues covered will vary. Designed principally for M.P.A. students ... the last half of their program. (Summer)

290 **Special Topics** (3) Staff
Experimental course; new course topics and teaching methods. May be repeated once for credit.

295 **Research Methods** (3) Adams, Newcomer
Theory and practice in research methodology. Data sources and gathering, re... search models and designs. Critical evaluation of research studies. Empha... application of research methods to policy questions. (Fall and spring)

296 **Statistical Applications in Public Administration** (3) Adams, New...
Use of statistics, computers, and SPSS in research and program evalu... Emphasis on interpretation and use of statistics. Development of basic stat... cal competency: frequency distribution, sampling, central tendency, vari... bility, correlation, probability, regression. (Fall and spring)

298 **Directed Readings and Research** (3) Staff
Supervised reading in selected fields within public administration. Admiss... by permission of instructor. May be repeated once for credit.

299 **Thesis Seminar** (3) Staff

300 **Thesis Research** (3) Staff

311 **Seminar: Public–Private Sector Institutions and Relationships** (3)
Same as SMPP 311. McSwa...

324 **Seminar: The Complex Organization** (3)
Unique problems of complex organizations, public, private, and mixed. Emerg... ing concepts and theories. Selected issues. McSwa...

373 **Seminar: Public Administration and American Political and Social Institutions** (3)
Supervised in-depth study of contemporary and historical literature in selec... fields in public administration. (Spring) Harm...

374 **Seminar: Trends in Public Administration Theory** (3)
Survey of contemporary normative and epistemological issues in ... administration theory and practice. Analysis of the past and present influ... of logical positivism, behaviorism, humanism, existentialism, and phenom... enology (Fall) Cam...

377 **Seminar: Foundations of Public Policy** (3)
Interdisciplinary approach to the normative foundations of public policy ... on theoretical problems of social action; interrelation of theory and prac... (Spring) Staff

393 **Current Topics and Research** (1) Staff
Current research discussed in a colloquium setting. The conduct of research ... presentation of research findings. May be repeated for credit.

398 **Advanced Reading and Research** (arr.) Staff
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

399 **Dissertation Research** (arr.)
Limited to doctoral candidates. May be repeated for credit.

PUBLIC POLICY

Master's Coordinating Committee
J.J. Cordes (*Public Policy*), W.B. Griffith (*Philosophy and Social Policy*), H. Merchant (*Environmental and Resource Policy*), B. Miller (*Women's Studies*), R.P. Stoker (*Public Policy*)

Doctoral Committee
J.J. Cordes (*Director*), W.B. Griffith, C. Harrison, J.R. Heng, A. Malik, R. Stoker, V. Vanc... P. Wirtz

Columbian School of Arts and Sciences offers interdisciplinary programs leading to the degrees of Master of Arts and Doctor of Philosophy in the field of public policy. Four master's programs enable students to concentrate in one of four policy areas, while completing a largely common core of courses in economics, politics, quantitative methods, and approaches to policy analysis.

Master of Arts in the field of public policy with a concentration in environmental and resource policy—See Environmental and Resource Policy.

Master of Arts in the field of public policy with a concentration in philosophy and public policy—See Philosophy.

Master of Arts in the field of public policy with a concentration in women's studies—See Women's Studies.

Master of Arts in the field of public policy with a concentration in methods of policy analysis—Required: the general requirements stated under Columbian School of Arts and Sciences, including (1) four courses in the common policy core: Econ 217, PSc 229, PPol 211, and one course chosen from E&RP 240, Phil 230, or WStu 240; (2) four courses in methods of policy analysis: Econ 221, PSc 203, Mgt 225 or Educ 307, and a course emphasizing the legal framework of policy and/or analysis of statutes and regulations; (3) two courses in the chosen policy field, selected with approval of the advisor; (4) two approved electives.

Doctor of Philosophy in the field of public policy—Required: the general requirements stated under Columbian School of Arts and Sciences, including (1) the prequalifying core sequence: PPol 211–12, Econ 221–22, Mgt 223, Phil 230, PSc 203 and 229, and PAd 241; (2) a written qualifying examination; (3) Mgt 391; (4) a minimum of 18 hours in one of the policy fields: education policy, environmental and resource policy, health policy, labor market policy, national security policy, science and technology policy, telecommunications policy, and urban policy; (5) a written examination in a policy field.

Note: See the School of Business and Public Management and the Elliott School of International Affairs for other graduate degree programs with public policy concentrations.

211–12 **Research Methods in Policy Analysis** (3–3) Staff
Survey of methods used in public policy analysis and research, including statistical analysis of secondary data as applied to public policy problems, causal modeling, experimental and quasi-experimental designs, measurement issues, and qualitative research methods. Prerequisite to PPol 212: PPol 211 and Mgt 225. (Academic year).

295 **Special Topics in Public Policy** (4) Staff
Topics announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

298 **Independent Research** (arr.) Staff
Prerequisite: Permission of instructor and program director.

299 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination.

300 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

RADIOLOGICAL SCIENCES

Professors D.J. Goodenough, C.C. Rogers, D.O. Davis, B.W. Wessels, E.D. Yorke, B.M. Hendrickson (*Interim Chair*)
Associate Professors T.C. Fearon, P.F. Butler
Assistant Professor L.K. Hedges (*Research*)

Doctor of Philosophy in the field of radiological sciences with a concentration in medical physics—Prerequisite: A bachelor's degree in physics or the equivalent. Required: The general requirements stated under Columbian School of Arts and Sciences; Rad 203, 204, 205, 206, 207, 208, 209, and the General Examination.

Courses in fields: radiation therapy physics, radiobiology, diagnostic radiology physics, nuclear medicine, health physics, information systems, and biophysics.

Advanced Topics in Nuclear Magnetic Resonance I (3) Hedges
Topics include generation of nuclear magnetic resonance signals, Bloch equations, rotating frame analysis, relaxation mechanisms, quadrature phase detection,

tion, chemical shift, receiver coil design, image encoding, slice selection shim coils, magnet design, data processing, quality assurance, and zonal and tesseral harmonics mapping. Prerequisite, permission of instructor.

202 **Advanced Topics in Nuclear Magnetic Resonance II** (3) Hedges
Recent developments in nuclear magnetic resonance imaging, magnet design, surface coil design, and image quality analysis, related research developments. Prerequisite: Rad 201 or permission of instructor.

203 **Physics in Medicine I** (3) Fearon
Atomic and nuclear physics, interactions of charged particles with matter, interactions of electromagnetic radiation with matter, neutron physics, radiation detection and measurement.

204 **Physics in Medicine II** (3) Hedges
Physics of magnetic resonance imaging and nuclear medicine. Prerequisite: Rad 203 or permission of instructor.

205 **Physics of Diagnostic and Therapeutic Radiology I** (3) Fearon
Design of X-ray units; image formation, digital imaging, computed tomography, ultrasound imaging and radiation safety. Prerequisite: Rad 203 or permission of instructor.

206 **Physics of Diagnostic and Therapeutic Radiology II** (3) Yaeger
High-energy therapy machines, dosimetry theory and applications, concepts of patient treatment planning. Brachytherapy, display and evaluation of dose distributions, electron-beam therapy. Principles and concepts of radiation safety. Prerequisite: Rad 203 or permission of instructor.

207 **Medical Physics Radiation Laboratory I** (3) Butler, Fearon
Practicum based on the calibration and quality assurance programs for x-ray equipment used in diagnostic radiology. Prerequisite: Rad 203 or permission of instructor.

208 **Medical Physics Radiation Laboratory II** (3) Wyatt
Practicum based on the calibration and quality assurance programs for therapeutic radiology. Prerequisite: Rad 203 or permission of instructor.

209 **Medical Physics Radiation Laboratory III** (3) Hedges, Fearon, Goodman
Practicum based on the calibration and quality assurance programs for nuclear medicine and magnetic resonance imaging. Prerequisite: Rad 203 or permission of instructor.

210 **Special Topics in Medical Physics** (3) Staff
Experimental and clinical training in diagnostic radiology, nuclear medicine and therapeutic radiology. Prerequisite: Rad 203 or permission of instructor.

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit.

RELIGION

University Professor S.H. Nasr
Professors H.E. Yeide, Jr., D.D. Wallace, Jr., A.J. Hiltebeitel
Associate Professors P.B. Duff (*Chair*), R.J. Eisen

Master of Arts in the field of religion—Prerequisite: the degree of Bachelor of Arts with a major in religion from this University, or an equivalent degree, and reading knowledge in a foreign language related to the program of study (which may be demonstrated after enrollment in the program).

Required: the general requirements stated under Columbian School of Arts and Sciences. Of the 24 credit hours of required courses (exclusive of the thesis), at least 12 must be in third group religion courses; a maximum of 9 may be in a closely related field outside the Department of Religion as approved by the department. The Master's Comprehensive Examination must cover three fields (the thesis research must be on one of these three fields) selected from the following: the Hebrew Scriptures, the New Testament, Christianity, Hinduism, Islam, Judaism, history of religion in America, medieval religious thought, ethics, sociology of religion, and history of religions. A reading knowledge examination, usually in French or German, is required; however, Hebrew or Greek is acceptable for those students whose thesis area is in the Biblical field and Arabic, Sanskrit or an Eastern language for those whose thesis area is in the history of religions.

Master of Arts in the field of history of religions– Hinduism (Consortium of Universities program)—Prerequisite: A Bachelor of Arts degree with a suitable background

study of religions of South Asia and reading knowledge in a foreign language, usually French or German (which may be demonstrated after enrollment in the program).

Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 24 hours of course work (exclusive of thesis) selected from upper-division and graduate courses of member universities of the Consortium, as determined by the Department of Religion, including a sequence of four courses in the literature of the Hindu tradition and one course on method in history of religions. A degree candidate at George Washington University must take a majority of the credit hours toward the degree from this university. The Master's Comprehensive Examination must cover the following: methods in the study of religions; thematic comparisons between the Hindu tradition and at least two other religious traditions, including at least one Western tradition; and a special field in Hindu tradition. At least two semesters of either Sanskrit or Hindi must be taken in addition to the required courses for graduate credit. More complete information regarding program requirements is available from the program advisor, Professor A.J. Hiltebeitel.

Doctor of Philosophy in the field of American religious history—See History.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

209–10 **Biblical Studies** (3–3)
Major problems of Biblical literary, historical, and theological criticism. Duff

222 **Ethics** (3)
Selected topics. Yeide

237 **Theological Analysis** (3)
Historical and topical study of the development of important ideas in such areas as Christology, ecclesiology, and death. Yeide

248 **Topics in Jewish Thought** (3)

249 **Myth, Ritual and Symbolism** (3) Eisen, Hiltebeitel
Method and theory in the interpretation of myth and narrative, ritual and sacrifice, and symbolism, with primary reference to the history of religions.

255 **The Goddess in India and Beyond** (3) Hiltebeitel
The goddess traditions of Hinduism, with some attention to goddess traditions in the ancient Near East and the Mediterranean. Classical Sanskrit, Tantric, and popular expressions of Hindu goddess worship. Comparative studies and the issues of diffusion and archetypes.

257 **India's Great Epics** (3) Hiltebeitel
The *Mahabharata* and the *Ramayana* are treated in alternate offerings of the course. These founding epic texts of devotional (bhakti) Hinduism are taught in English translation. Vernacular and performative versions of the epics and Western adaptations.

258 **Currents of Modern Hinduism** (3) Hiltebeitel
Hinduism since the early seventeenth century. Colonialism, the impact of missionaries, orientalism, reform, relations between Brahmanical and popular Hinduism, Sanskritic and vernacular traditions, regionalism, communalism, nationalism, fundamentalism, politicized "syndicated" Hinduism, and secularism.

266 **Topics in the Study of Islam** (3) Nasr
Study of sources and approaches to the investigation of Islam by both Western Islamicists and Muslim scholars, with discussion of the main controversial issues and differences in methods used by various schools of scholarship. Prerequisite: A course on Islam or permission of instructor.

267 **Topics in Islamic Thought** (3) Nasr
Perennial major issues in Islamic theology, philosophy, and Sufism such as Divine Unity, prophetology, eschatology, religious knowledge, sacred law, and ethics. Prerequisite: A course on Islam or permission of instructor.

271 **American Religion to 1830** (3) Wallace
Religious thought and life during the Colonial and early National periods.

272 **American Religion Since 1830** (3) Wallace
Religious thought and life from the Civil War to the present.

291–92 **Readings and Research** (1–4) Staff
Investigation of special problems.

295–96 **Thesis Research** (3–3)

ROMANCE LANGUAGES AND LITERATURES

270 **Seminar: Literary History** (3) Staff
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

271 **Seminar: Literary Criticism** (3) Staff
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

272 **Seminar: Literary Theory** (3) Staff
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

273 **Seminar: History of the Language/Linguistics** (3) Staff
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

RUSSIAN AND EAST EUROPEAN STUDIES

Program Committee: M.A. Atkin (*Director*), H. Agnew, C.A. Linden, J.R. Millar, Pelzman, P. Reddaway, R. Robin, M.J. Sodaro, R. Thornton

Master of Arts in the field of Russian and East European studies—Offered by the Elliott School of International Affairs, this multidisciplinary program gives students a broad grasp of the history, politics, economics, cultures, and languages of Russia, other successor states of the former Soviet Union, and Central/Eastern Europe.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Before acceptance into the program, all students must show evidence of satisfactory completion of at least two years of study of Russian, another language of the former U.S.S.R., or an appropriate Central/East European language. All students are expected to have background preparation of at least two courses in Russian and/or East European history and one course in domestic and foreign politics and government, focusing on the region. If any of the background courses are lacking, equivalent courses must be taken for graduate credit and can be counted toward degree requirements.

Required: the general requirements stated under the Elliott School of International Affairs. The 42-credit-hour program may be completed with or without a thesis. Students qualify to write a thesis if they meet requirements stated under The Thesis in the Elliott School section of this Bulletin.

In consultation with the program director, each student selects a core field and two additional fields. The core field must be either Central/Eastern Europe or Russia and the former Soviet Union/CIS. For the core field, students must choose at least one graduate course on the region in the Departments of Economics, History, and Political Science. For the two additional fields, students must choose regionally focused courses from at least two academic disciplines. Students may also choose an international business field from the M.A. program in international affairs as one of the non-core fields. Consult the program guidelines available from the Elliott School about specific courses in all fields described above. All students must successfully complete a policy project in their final spring semester of studies as part of IAff 292.

During the final 18 hours in residence, candidates must pass an oral and reading proficiency examination in Russian, or another language of the former U.S.S.R., or an appropriate Central or East European language. Six credits of language study and research in IAff 201 may be applied toward the degree.

SCIENCE, TECHNOLOGY, AND PUBLIC POLICY

Program Committee: R.W. Rycroft (*Director*), M.C. LaFollette, J.M. Logsdon, N.S. Vig

Master of Arts in the field of science, technology, and public policy—The Elliott School of International Affairs offers an interdisciplinary program that focuses on interactions among scientific development, technological change, and governmental activities, both domestically and internationally. The program is designed to train individuals to understand and manage issues of science and technology policy.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School. The program consists of 36 credit hours, which include 4 hours of a research project. Students must successfully complete a policy project

of IAff 229. The two fields are science, technology, and international affairs, and an elective field (a minimum of three courses, which may be in a field offered in another Elliott School program, a field in an academic department, or a field in a specific issue area such as management science, international business strategic management and public policy, public administration, or engineering management). The science, technology, and international affairs field consists of IAff 220, 229, and three courses chosen from IAff 221, 222, 223, 224, 225.

Students must also successfully complete 6 hours in analytical competency. To fulfill this requirement, students may choose two courses from Econ 217, 218, PAd 260, 264, 295, 296, Stat 105, 112, 118, 183. In instances where proficiency in a foreign language is judged by the program director and the dean to be integral to the student's program of study, it may be used to meet the analytical competency requirement. However, courses taken to develop language proficiency may not be counted toward the degree. Up to 3 credits of IAff 201 may be counted toward the degree.

SECURITY POLICY STUDIES

Program Committee: D. Avant (*Director*), M. East, J. Goldgeier, R. Grinker, J. Hershberg, J. Post, R. Spector

Master of Arts in the field of security policy studies—This interdisciplinary program, offered by the Elliott School of International Affairs, prepares individuals for professional careers in international security and defense analysis.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School. The program consists of 36 credit hours in three fields. There is no thesis option. All students must take three courses in the required core field of international security issues (IAff 253, Hist 228, and PSc 230 or 249). The second field must be chosen from defense policy analysis, strategy and military history, transnational security, science, technology, and public policy, or U.S. national security. The third field may also be selected from the above or from an approved field in the M.A. program in international affairs. The three fields must represent at least two academic disciplines; no more than 21 hours of course work may be taken in any one department or discipline. Students should consult the program guidelines for specific course work within the fields.

Students must successfully complete a capstone policy project.

Familiarity with economic theory and concepts at the level of Econ 217 or 218 is required. The tool requirement must be satisfied by demonstration of proficiency in statistics or by demonstration of reading and oral proficiency in a modern foreign language by passing a language exam during the final 18 hours in residence.

In addition to the courses listed in the program guidelines, related courses in other disciplines may be taken with approval of the program director or an academic advisor. Up to 3 credits of IAff 201 may be taken as part of the program.

700 SERIES

The 700 Series is made up of experimental or special courses that are on the cutting edge of the academic endeavor. Often, courses in the 700 Series focus on interdisciplinary or current issues in a field. Because 700 Series courses change on a semester, students should consult the *Schedule of Classes* for offerings. Courses are listed with the participating departments' course descriptions appear in a specially designated section of the Bulletin.

Courses numbered 701 are in general studies, 721 courses are interdepartmental, 751 courses are interschool, and 770s and 780s are taught by University Professors and are listed in this Bulletin under the designation of University Professors. The program is coordinated by the Director of Summer, Special, and International Programs.

SOCIOLOGY

[illegible] Professor A. Etzioni

[illegible] R.W. Stephens, T.F. Courtless, Jr., P.H.M. Lengermann (*Research*), R.A. [illegible], P. Langton, W.I. Chambliss, R.C. Rist, M.K. Wolfe (*Chair*), I.L. Tropea

[illegible] Professors S.A. Tuch, R. Weitzer, H. Nashman, C. Deitch

[illegible] Associate Professors M.E. Bouckmann, M.E. McIntosh, R.B. Zamoff, R. Whitaker

Assistant Professor M.L. Huffman (*Visiting*)
Adjunct Assistant Professors N.A. Briggs, J.F. Markey

Master of Arts in the field of sociology—Prerequisite, a bachelor's degree with a ma in sociology or in an approved related field.

Required, the general requirements stated under Columbian School of Arts and Sc ences. All students must complete at least 24 credit hours of graduate course work plu thesis (Soc 299–300), or at least 33 credit hours of graduate course work without a the and a comprehensive examination that covers the substance of academic work pursue Students choose either the general track or the quantitative track. In the general track, S 230, 231, 238, 239, and either 232 or 240 are required. In the quantitative track, Soc 231, 238 or 239, 254, 255, and Stat 118 are required.

230 **Sociological Research Methods** (3)
Survey of the procedures, methods, and problems of contemporary sociologica data collection, with an emphasis on survey methods. Major topics include re search design, instrument construction, survey sampling, and measurement (Fall) Tuc

231 **Data Analysis** (3)
Intensive study of quantitative data analysis techniques, with strong emphasis on computer applications. Prerequisite, Soc 230. (Spring) Chambliss, Langton, Wallace, Weitz

232 **Qualitative Methodology: Doing Field Research** (3)
Practical application of data collection methods in natural settings; observation participant observation, and field experience. Emphasis on implementing re search projects by using these methods for purposes of developing empirically grounded theory. (Fall) Wallac

238 **Development of Sociological Theory** (3)
Development of sociology from the early 1800s to the 1920s. Intensive analysis of the classical theoretical statements. (Fall) Wa

239 **Modern Sociological Theory** (3)
Intensive examination and evaluation of contemporary schools of sociologica theory in Europe and America. Advanced analysis of theoretical perspectives (Spring) Langto

240 **Field Research in Organizational Settings** (3)
Applications of field research techniques in formal organizational settings. Ex amination of the logic of qualitative inquiry and techniques of qualitative data collection. Intensive interviewing and participant observation in field settings are emphasized. (Fall) Langto

242 **Medical Sociology** (3)
Study of the social structure of health care and the interplay of the various health professions, examination of social factors and processes related to the etiology and treatment of illnesses. (Fall) Wh

244 **Sociology of Families and Kinship** (3)
A systematic introduction to recent theoretical perspectives and empirica research on family patterns. The course combines a focus on how and why societal family patterns vary and change over time with an examination of how individuals vary in their experience of life course transitions, such as marriage childbirth, employment, divorce, and retirement (Fall) Tuc

245 **Race Relations** (3)
Systematic analysis of race relations and inequality, primarily in the United States. Topics include current status and recent trends in inequality, the institutional and organizational patterning of discrimination, the structure of racial attitudes, theoretical perspectives on race relations, and selected policy issues (Spring) Weitz

246 **Comparative Race and Ethnicity** (3)
Examination of race and ethnic relations in comparative, international per spective. Selected societies are analyzed in terms of patterns of racial and eth nic inequality, intergroup relations, institutional foundations of discrimination social control systems, and sources of social change. (Spring) S

252 **Selected Topics** (3)
Examination of selected topics of general importance to sociology. May be peated once for credit. (Fall and spring)

253 Topics in Contemporary Chinese Society (3) Whyte
Intensive analysis of a particularly important aspect of, or trend in, the grass-roots social organization of China. Prerequisite: one prior course dealing with contemporary China or permission of the instructor. May be repeated for credit if the topic differs. (Spring)

254 Evaluation Research (3) Boeckmann
Systematic survey of the conceptualization, design, and practice of evaluation research. Prerequisite: Soc 230. (Spring)

255 Practicum in Applied Research (3) Staff
Supervised research in policymaking projects in public and private organizations. May be repeated for credit. Prerequisite: Soc 254. (Fall, spring, and summer)

258 Deviance and Control (3) Tropea Weitzer
Examination of major theories and research in the field of deviance and social control, with special emphasis on recent empirical advances and comparative perspectives. (Spring)

259 Law and Criminology (3) Courtless
The role that criminological knowledge of crime causation may play in developing effective alternative social and legal devices in controlling deviant behavior. Same as Law 366. (Fall)

261 Law of Criminal Corrections (3) Courtless
Study of the development and current use of society's three major approaches to the handling of offenders: punitive, incapacitating, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, research findings concerning effectiveness of these responses. Same as Law 368. (Spring)

271 Gender and Society (3) Wallace
An examination of quantitative and qualitative research in the field of gender, with emphasis on current empirical research. (Fall)

272 Theoretical Perspectives on Gender (3) Wallace
Review of significant theoretical writings on gender and gender inequality, with a primary focus on contemporary sociological statements. (Spring)

290 Principles of Demography (3) Boulier
Same as Econ/Geog/Stat 290.

291 Methods of Demographic Analysis (3) Boulier
Same as Econ/Geog/Stat 291.

295 Research (arr.) Staff
Independent study and special projects. Before permission is granted to register for Soc 295, the student must submit a written plan of study for the approval of the staff member of the department who will be directing the research. May be repeated once for credit. (Fall, spring, and summer)

299–300 Thesis Research (3–3) Staff

SPECIAL EDUCATION

See **Teacher Preparation and Special Education.**

SPEECH AND HEARING

Professor C.W. Lanehaugh
Associate Professors M.D.M. Brewer, J.R. Regnell, V.D. Larson (*Chair*)
Associate Professorial Lecturers L.B. Beck, J.D. Schafer
Assistant Professors L.B. Stewart, L.R. Goldberg
Assistant Professorial Lecturers C.L. Person, D. Williamson, M.E. Moody, N.S. Richards
Clinical Professor L.O. Shekim
Clinical Instructors L. Jacobs Condit, P. Mason, R.T. Walton, S. Yaffe-Ozuel

Master of Arts in the field of speech–language pathology and audiology—Prerequisite: degree of Bachelor of Arts with a major in speech and hearing science from this University or an equivalent degree, and an appropriate score on the Aptitude Test of the Graduate Record Examination.

Meet the general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 40 credit hours of approved course work without thesis or, with the approval of the department, 34 credit hours of approved course work

plus a thesis (SpHr 299–300). All students must satisfy the academic and supervised practicum requirements of the Certificate of Clinical Competence awarded by the American Speech–Language–Hearing Association and satisfactorily complete the Master's Comprehensive Examination.

As one component of the Master's Comprehensive Examination, all students must take the National Examination in Audiology or in Speech Pathology available through the Educational Testing Service. Students must request the Testing Service to send copies of test scores to the Department of Speech and Hearing to be used in partial fulfillment of the general requirement in Columbian School for the Master's Comprehensive Examination. Test results must reach the department at least three weeks before graduation.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Program Bulletin for course listings.

201 **Clinical Practicum in Speech–Language Pathology** (1 to 6) Will be offered
Supervised clinical practice in the evaluation and treatment of speech and language disorders, counseling of clients and families, development of treatment plans and writing of evaluation and progress reports. Admission by permission of the instructor. May be repeated for up to 6 credit hours. (Fall, spring, and summer) Staff

202 **Clinical Practicum in Audiology** (1 to 6)
Supervised clinical practice in behavioral and electrophysiologic assessment of hearing, hearing aid assessment and fitting, and aural rehabilitation with clients and families, writing evaluation and progress reports. Admission by permission of the instructor. May be repeated, but may not be taken for more than 6 credit hours. (Fall, spring, and summer) Lander, Staff

210 **Research and Professional Issues in Communication Sciences and Disorders** (2)
Review of fundamental issues and methods in clinical research, including group and single-subject experimental designs. Consideration of professional issues, including ethics and multicultural issues in clinical practice. Laboratory fee, $12. (Spring) Ratner

220 **Disorders of Articulation and Phonology** (4)
Survey of the nature and causes of impairments of speech sound production in children and adults. Differential diagnosis of oral motor versus phonological disorders, treatment approaches, identification and modification of regional dialects and foreign accents. Laboratory fee, $12. (Spring) Ratner

221 **Neurodevelopmental Disorders of Speech Production** (2)
Evaluation and treatment of infants and children with neurodevelopmental speech disorders, including cerebral palsy. Emphasis on management of speech oral motor and feeding impairments. Laboratory fee, $12. (Spring) Staff

222 **Neuromotor Disorders of Speech Production** (2)
Methods for assessing acquired neuromuscular speech disorders and their physical, acoustic, and perceptual characteristics. Differential diagnosis and treatment of apraxia of speech, the dysarthrias, and other neuromotor speech disorders. Laboratory fee, $12. (Summer) Staff

240 **Pediatric Language Impairments I** (4)
Survey of current approaches for assessing and treating language impairments disorders in infants, toddlers, preschoolers, school-age children, and adolescents. Review of standardized, observational, and ethnographic approaches used in language assessment; current models of intervention and service delivery. Laboratory fee, $12. (Fall) Staff

241 **Pediatric Language Impairments II: Early Intervention** (2)
In-depth study of theoretical and practical approaches for assessing and treating language impairments in infants, toddlers, and preschool children. Methods used in family needs assessment, Individualized Family Service Plans, and ethnographic assessment; models of team functioning and collaboration; procedures for language intervention. Laboratory fee, $12. (Spring) Staff

242 **Pediatric Language Impairments III: Special Populations** (2)
Assessment and clinical management of communication disabilities in special populations, including children with specific language learning disabilities, attention deficit disorder, and traumatic brain injury. Bicultural issues, multicultural issues, curriculum-based and dynamic assessment procedures, and models of collaboration and consultation. Laboratory fee, $12. (Fall) Staff

240 **Neurologic Communication Disorders** (4) Shekim
Differential diagnosis of aphasia and other cognitive–linguistic impairments, apraxia of speech, and dysarthria. Emphasis on model-based intervention. Laboratory fee, $12. (Fall)

241 **Applied Neurolinguistics** (2) Staff
Current neurolinguistic theories. Application of neurolinguistic models to the diagnosis and treatment of aphasia and cognitive–communicative disorders related to right brain damage, traumatic brain injury, and dementia. Laboratory fee, $12. (Spring)

250 **Speech Fluency Disorders: Evaluation and Treatment** (4) Staff
Procedures for clinical assessment of stuttering and other disorders of speech rate and rhythm. Review of historical and current methods for treatment. Laboratory fee, $12. (Spring)

260 **Voice Disorders: Evaluation and Treatment** (4) Regnell
Normal anatomy and physiology of the human vocal mechanism. Nature, causes, and clinical management of functional and organic voice disorders, including laryngectomy. Laboratory fee, $12. (Fall)

261 **Seminar: Voice Disorders** (2) Regnell
Advanced study of selected theoretical and clinical issues regarding voice disorders. (Spring)

270 **Clinical Audiology I** (3) Larson
Psychoacoustic principles and methods underlying the assessment of auditory disorders. Anatomy and physiology of the auditory mechanism. Laboratory fee, $12. (Fall)

271 **Clinical Audiology II** (3) Schafer
Audiological assessment of middle ear function, speech audiometry, and management of diagnostic information. Laboratory fee, $12. (Fall)

272 **Pediatric Audiology** (3) Yaffe-Oznel
Embryologic development of the auditory mechanism. Nature and causes of auditory impairments; audiometric techniques used to measure hearing in children. Laboratory fee, $12. (Spring)

273 **Electrophysiologic Assessment of Hearing** (3) Schafer
Study of electrophysiologic techniques used to assess cochlear and retrocochlear function. Theories and clinical applications of vestibular tests, auditory brainstem-evoked responses, and electrocochleography. Laboratory fee, $12. (Spring)

274 **Central Auditory Processes** (3) Staff
Factors affecting auditory perception and comprehension. Identification and clinical management of central auditory processing disorders in children and adults. Laboratory fee, $12. (Fall)

275 **Industrial Audiology** (3) Staff
Theories and processes pertinent to communicative disorders related to industrial noise. Consideration of hearing conservation programs, environmental assessment, and relevant legislation. (Fall)

276 **Aural Rehabilitation** (3) Brewer
Habilitation/rehabilitation of the hearing impaired, including auditory training, speech reading, hearing aids, assistive listening devices, communication strategies, and counseling. Laboratory fee, $12. (Fall)

277 **Psychoeducational Management of Children With Hearing Impairment** (3) Brewer
Study of the psychosocial and educational effects of hearing loss. Assessment, remediation, and management approaches related to the education of the hearing impaired. Laboratory fee, $12. (Summer)

278 **Hearing Aids** (3) Larson
Discussion of hearing-aid characteristics and electroacoustic measurements; hearing and effectiveness in improving communicative efficiency; procedures for selection and clinical evaluation of hearing aids; counseling of the patient. Laboratory fee, $12. (Spring)

281 **Dysphagia** (2) Shekim
Anatomy and physiology of normal swallowing. Nature and causes of dysphagia in adults. Assessment, including clinical examination and radiological methods; treatment. Laboratory fee, $12. (Fall)

282 **Augmentative Communication and Computer Applications in Communication Disorders** (2) Staff
Principles of assessment, development, and selection of augmentative and al
ternative communication systems; application through case studies. Computer
applications, including review of selected hardware and software and selection
criteria. Laboratory fee, $20. (Fall)

290 **Selected Topics in Clinical Audiology** (1 to 3) Brewer
Advanced study of selected theoretical and clinical issues. May be repeated, but
may not be taken for more than a total of 6 credits. (Fall, spring, and summer)

291 **Selected Topics in Speech–Language Pathology** (1 to 3) Staff
Advanced study of selected theoretical and clinical issues regarding various
aspects of practice in speech–language pathology. May be repeated but not for
more than a total of 6 credit hours. (Fall, spring, and summer)

295 **Independent Research in Speech, Language, and Hearing** (arr.) Staff

299–300 **Thesis Research** (3–3)

STATISTICS

Professors H.W. Lilliefors, A.D. Kirsch, J.L. Gastwirth, N.D. Singpurwalla, R.T. Smythe (*Chairs*), I.M. Lachin III, I.J. Vertes (*Research*), R.P. Bain (*Research*), H.M. Mahmoud, T.K. Nayak

Professorial Lecturers W.R. Nunn, N. Kirkendall, I.S. Wu, J. Kullback, F. Pontu, F. S. Hsieh

Associate Professors B. Toman, J. Rochon (*Research*), E.A. Thom (*Research*), S. Bose, S. Modarres-Hakimi, Z. Li

Associate Professorial Lecturers R.F. Teitel, C. Cowan

Assistant Professors D.A. Graef, N. Younes (*Research*), E. Bura, V. Katsikiotis (*Research*)

Assistant Professorial Lecturer R. Fernandez

Master of Science in the field of statistics—General prerequisite: course work in multivariate calculus, matrix theory, and regression analysis (Math 33 and 124, Stat 216).

Required: The general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 30 credit hours of course work without a thesis. In exceptional cases the department may approve a program of study consisting of 24 credit hours of course work plus a thesis (Stat 299–300). Candidates must pass a written Master's Comprehensive Examination. Two options are provided: applied statistics and mathematical statistics. For prerequisites and additional requirements specific to each option, see below.

Option in applied statistics—Required: Stat 201–2, 210, 217.

Option in mathematical statistics—Recommended prerequisite: course work at the level of advanced calculus. Required: Stat 201–2, 218, and either Stat 218 or 217.

In each option, additional courses are to be selected in consultation with the adviser.

Master of Science in the field of industrial and engineering statistics—The program offered jointly by the Department of Statistics and the Department of Operations Research. Students will apply either to Columbian School of Arts and Sciences or the School of Engineering and Applied Science, but must be admissible to both; see the respective sections for entrance requirements.

Required: The general requirements stated under Columbian School of Arts and Sciences and the School of Engineering and Applied Science. Prerequisites and requirements specific to the program are stated under the Operations Research head in the section of the School of Engineering and Applied Science. Candidates must pass a Master's Comprehensive Examination.

Doctor of Philosophy in the field of statistics—Prerequisite: A master's degree in statistics or a related discipline. The main requirement is a strong background in mathematics, including courses in advanced calculus, linear algebra, and mathematical statistics (similar to Stat 201–2). Some deficiencies may be made up concurrently during the student's first year. In some instances, a student may enter the Ph.D. program with a master's degree.

Required: The general requirements stated under Columbian School of Arts and Sciences, including satisfactory completion of (1) Stat 201–2, 217, 218, 228 or 273, 261, 262, 263, 264, and at least two courses chosen from among Stat 262, 265, 66, 363, 364, 365, a minimum of 15 additional credit hours as determined by consultation with the departmental doctoral committee; (3) proficiency in computer languages as demonstrated by course work or an examination; (4) the General Examination, consisting of two parts:

a written qualifying examination that must be taken within 24 months from the date of enrollment in the program and is based on the four-course core (Stat 257, 258, 263, 264) and (b) an examination to determine the student's readiness to carry out the proposed dissertation research, and (5) a dissertation demonstrating the candidate's ability to do original research in one of the following fields: Bayesian inference, biostatistics, design of experiments, multivariate analysis, nonparametric statistics, probability (theoretical or applied), reliability theory, robust methods, sampling, statistical computing, statistical inference, stochastic processes, and time series.

Master of Science and Doctor of Philosophy in the fields of biostatistics and epidemiology—See Biostatistics and Epidemiology.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

201–2 **Mathematical Statistics** (3–3) Lilliefors, Smythe
Distribution theory, sampling theory, estimation, sufficient statistics, hypothesis testing, analysis of variance, multivariate normal distribution. Prerequisite: Math 33, 124. (Academic year)

206 **Multivariate Methods in the Behavioral Sciences** (3) Kirsch
Applications of advanced experimental design and multivariate analysis to the data of the social sciences. Design and analysis of single- and multiple-factor experiments, factor analysis, discriminant analysis, and other topics. Prerequisite: Stat 105 or 118 or equivalent and permission of instructor. Not open to graduate students in mathematical statistics. (Spring)

207 **Methods of Statistical Computing I** (4) Lilliefors, Modarres-Hakimi
Error analysis, computational aspects of linear models, sweep operator, random number generation, simulation, resampling, Optimization, numerical integration (Gaussian quadrature, Simpson's rule), E-M algorithm. Prerequisite: Stat 118, 157–58; Math 124; knowledge of a programming language.

208 **Methods of Statistical Computing II** (3) Staff
Numerical linear algebra, matrix decomposition and eigenvalue problems. Smoothing and density estimation. Graphics: interactive and dynamic techniques for data display. Object-oriented programming. Prerequisite: Stat 118, 157–58; Math 124; and knowledge of a programming language.

210 **Data Analysis** (3) Lachin
Review of statistical principles of data analysis, using computerized statistical procedures. Multiple regression and the general linear model, analysis of contingency tables and categorical data, logistic regression for qualitative responses. Prerequisite: Stat 118, 157 or 201, and 183 or equivalent. (Spring)

213 **Intermediate Probability and Stochastic Processes** (3) Smythe
Discrete and continuous random variables and their distributions, conditional distributions and conditional expectation, generating functions and their applications, convergence of random variables, introduction to Brownian motion. Prerequisite: Stat 201–2 or equivalent. (Spring)

215–16 **Applied Multivariate Analysis** (3–3) Staff
Application of multivariate statistical techniques to multidimensional research data from the behavioral, social, biological, medical, and physical sciences. Prerequisite: Stat 119, 157–58; Math 124. (Alternate academic years)

217 **Design of Experiments** (3) Biese, Toman
Design and analysis of single- and multiple-factor experiments. Includes block designs, repeated measures, factorial and fractional factorial experiments, response surface experimentation. Prerequisite: Stat 157–58; Math 1–3.

218 **Linear Models** (3) Biese, Toman
Theory of the general linear parametric model. Includes least squares estimation, multiple comparisons procedures, variance components estimation. Prerequisite: Stat 201–2; Math 124.

223 **Design of Experiments for Behavioral Sciences** (3) Kirsch, Toman
Applications of advanced experimental design to research problems in behavioral sciences and education. Prerequisite: Stat 105 or 118 or equivalent and permission of instructor. Not open to graduate students in mathematical statistics. (Spring)

223 **Bayesian Statistics: Theory and Applications** (3) Singpurwalla, Toman
An overview of Bayesian statistics, including its foundational issues, decision under uncertainty, linear models, expert opinion, and computational issues. Prerequisite: Stat 201–2. (Spring, alternate years)

224 **Design of Medical Studies** (3) Bain, Lachin
Design of medical investigations, including the randomized clinical trial, observational cohort study, and retrospective case-control study. Specific methods regarding sample size, power and precision, and statistical procedures for randomization and sampling. Ethics of clinical trials and the intention-to-treat principle. Prerequisite: Stat 201 or 157. (Spring)

225 **Biostatistical Methods** (3) Lachin, L
Biostatistical methods for asymptotically efficient tests and estimates of relative risks and odds ratios from prospective and retrospective matched and unmatched studies. Fixed and random effects models. Logistic, conditional logistic, and Poisson regression models. Maximum likelihood and efficient scores. Prerequisite: Stat 201–2 or permission of instructor. (Fall) Stat

226 **Advanced Biostatistical Methods** (3)
Statistical methods for the analysis of longitudinal data: nonparametric, fixed effects, mixed effects, generalized estimating equations. Methods for the analysis of emerging data: group sequential analysis, Brownian motion, Bayesian methods, and stochastic curtailment. Other advanced topics of current research in biostatistics. Prerequisite: Stat 201–2 or permission of instructor. Lachin, L

227 **Survival Analysis** (3)
Parametric and nonparametric methods for the analysis of events observed in time (survival data), including Kaplan–Meier estimate of survival functions, log rank and generalized Wilcoxon tests, the Cox proportional hazards model and an introduction to counting processes. Prerequisite: Stat 201–2 or permission of instructor. (Fall) Ra

231 **Categorical Data Analysis** (3)
A study of the theoretical bases underlying the analysis of categorial data. Measures and tests of association, Mantel-Haenszel procedure, weighted least squares and maximum likelihood estimators in linear models; estimating equations; logistic regression; loglinear models. Prerequisite: Stat 201–2 (Spring, alternate years)

257 **Probability** (3) Mahmoud, Smythe
Probabilistic foundations of statistics, probability distributions, random variables, moments, characteristic functions, modes of convergence, limit theorems, probability bounds. Prerequisite: Stat 201–2, knowledge of calculus through functions of several variables and series. (Fall) Gastwirth

258 **Distribution Theory** (3)
Special distributions of statistics, small and large sample theory, order statistics, and spacings. Prerequisite: Stat 257. (Spring) Smythe

259 **Advanced Probability** (3)
Conditional expectation and martingales; weak convergence in general metric spaces and functional central limit theorems for i.i.d. random variables and martingales; applications to biostatistics. Prerequisite: Stat 257 or an equivalent measure-theoretic introduction to probability Mahmoud

262 **Nonparametric Inference** (3)
Inference when the form of the underlying distribution is unspecified. Prerequisite: Stat 201–2 Navidi, Ros

263 **Advanced Statistical Theory I** (3)
Decision theoretic estimation, classical point estimation, hypothesis testing. Prerequisite: Stat 201–2. (Fall) Navidi, Ros

264 **Advanced Statistical Theory II** (3)
Asymptotic theory, hypothesis testing, confidence regions. Prerequisite: Stat 257, 263. (Spring) Navidi

265 **Multivariate Analysis** (3)
Multivariate normal distribution, Hotelling's T^2 and generalized T_0^2, Wishart distribution, discrimination and classification. Prerequisite: Stat 201–2. (Fall, alternate years) Stat

266 **Topics in Multivariate Analysis** (3)
Multivariate analysis of variance, principal components, canonical correlation, factor analysis. Prerequisite: Stat 265 (Spring, alternate years)

271 **Foundational and Philosophical Issues in Statistics** (3) Singpurwalla
Axiomatic underpinnings of Bayesian statistics, including subjective probability, belief, utility, decision and games, likelihood principle, and stopping rules. Examples from legal, forensic, biological, and engineering sciences. Students are expected to have a background in computer science, economics, mathematics, or operations research. Prerequisite: Stat 201–2

273–74 **Stochastic Processes** (3–3) Staff
Fundamental notions of Markov chains and processes, generating functions, recurrence, limit theorems, random walks, Poisson processes, birth and death processes, applications. Prerequisite: Stat 201–2 (Alternate academic years)

275 **Econometrics I: Introduction** (3) Staff
Same as Econ 275. (Fall)

276 **Econometrics II: Simultaneous Equations Models** (3) Staff
Same as Econ 276. (Fall)

281 **Advanced Time Series Analysis** (3) Kirkendall, Wu
Autoregressive integrated moving average (ARIMA) modeling and forecasting of univariate and multivariate time series. Statespace or Kalman filter models, spectral analysis of multiple time series. Theory and applications using the University computer. Prerequisite: Math 33, Stat 201–2 or equivalent. (Spring)

284 **Computer-Intensive Methods in Industrial and Engineering Statistics** (3) Singpurwalla, Toman
Computer-aided design and analysis of industrial experiments, including factorial, Taguchi, and other designs. Analysis of survival, reliability, and quality control data, including reliability growth and point processes. Simulation techniques in reliability analysis. Corequisites: OR 281, Stat 217. Same as OR 284.

287–88 **Modern Theory of Sample Surveys** (3–3) Staff
Application of statistical theory to the sampling of finite populations. Simple, stratified, cluster, double and subsampling. Special topics, including superpopulations and randomized response. Prerequisite: Stat 91 and Math 32 or equivalent. (Academic year)

289 **Seminar** (1) Staff
Admission by permission of instructor. (Fall and spring)

290 **Principles of Demography** (3) Staff
Same as Econ 290.

291 **Methods of Demographic Analysis** (3) Staff
Same as Econ 291.

295 **Reading and Research** (3) Staff
May be repeated once for credit.

297 **Joint Doctoral Seminar on Current Topics in Epidemiology and Biostatistics** (3) Staff
Review of current topics of interest or controversy in epidemiology and in biostatistics. Students research an assigned topic in a tutorial setting with an assigned proctor and present their research findings to the seminar. Prerequisite: admission to Unit II of the Ph.D. program. (Summer)

298–99 **Thesis Research** (3–3) Staff

998 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

999 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.

STRATEGIC MANAGEMENT AND PUBLIC POLICY

Professors H.J. Davis, W.H. Becker, D.J. Lenn
Associate Lecturer: W.N. LaForge
Professors L.B. Thurman, J. Cook, E.J. Inglander (*Chair*), J.H. Beales III, M. Starik
Professor
Professorial Lecturers M.N. Richburg, P. Longman
Professors D.R. Kane, H. Kim, R.A. Carruth, J. Griffin
Professorial lecturer S.E. Burke
A. Prakash

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy.

202 **Business–Government Relations** (3) Lenn, Englander, Becker
Historical and philosophical foundations of the business-government relationship. Regulation, international trade, and corporate political activities. Public policy issues facing business and the business community's political response. Prerequisite: MBAd 260 or equivalent. (Fall, spring, and summer) Staff

205 **Business Representation and Lobbying** (3)
Strategies, tactics, and techniques used by business in representing itself to the legislative and executive branches and regulatory agencies of the federal government. Legal and practical constraints. Ethical considerations. (Fall) Becker

206 **Applied Microeconomics** (3)
Applications of economic theory to public and private decisions with emphasis on public policy analysis. Focus on market structure and its implications. Imperfect information, common property, public goods and externalities. Economic analysis of government behavior and legal institutions. Prerequisite: Econ 217 or 219 and MBAd 220 or equivalent. (Spring) Staff

208 **Macroeconomic Policy and Business** (3)
Determination of national income, employment, inflation, and interest rates. The role of expectations in the economy. Impact of government purchases, tax policy, and deficits. Monetary policy institutions. The global economy and exchange rates. Prerequisite: Econ 218 or 219 and MBAd 220 or equivalent. (Fall)

209 **Seminar: Business Economics and Public Policy** (3) Lenn, Englander
Analysis and discussion of selected issues by students and representatives of government and business. Prerequisite: SMPP 202 or MBAd 260 or equivalent. (Spring) Staff

210 **Strategic Environmental Management** (3)
Examination and analysis of the orientation and actions of private, public, and nonprofit sectors in relation to their natural environments. Emphasis on organizational interaction and effectiveness, particularly regarding business firms and industry, on issues of environmental quality and sustainability. Staff

211 **Business Law: Contracts, Torts, and Property** (3) Staff
Same as Accy 211.

212 **Business Law: Enterprise Organization** (3) Staff
Same as Accy 212.

213 **Management of Strategic Issues** (3)
The body of management theory and practice that has evolved to identify, analyze, and resolve strategic organizational issues. Methodology of the field, applications to critical issues in labor relations, energy and pollution, marketing and consumerism, business-government relations, and the global economy. Prerequisite: MBAd 201–2. (Spring and summer) Staff

290 **Special Topics** (3)
Experimental offering; new course topics and teaching methods. May be repeated once for credit. Lenn, Grabbe

291 **Ethics and Business** (3)
Concepts and strategies of ethical analysis applied to specific business problems, e.g., risk management, plant relocation, preferential hiring, product advertising; development of theory of corporate social responsibility. Same as Phil 235. (Spring) Becker

293 **American Business History** (3)
The history of American business institutions in manufacturing, distribution, transportation, and finance. Particular attention will be given to the personnel, industrialization, with consideration of business institutions in their economic, legal, governmental, and social contexts. Same as Hist 220 (Fall) Staff

295 **Research Methods** (3)
Theory and practice in research methodology. Data sources and gathering, research models and designs, analysis and testing, controls, interpretation, and presentation of findings. Use of computer library programs and preparation of a formal business report. (Fall)

298 **Directed Readings and Research** (3) Staff
Supervised readings or research. Admission by prior permission of instructor. May be repeated once for credit. (Fall and spring)

299 **Thesis Seminar** (3) Staff

300 **Thesis Research** (3) Staff

311 **Seminar: Public–Private Sector Institutions and Relationships** (3) Staff
An analysis and critique of alternative theoretical frameworks for describing, understanding, and predicting the nature, values, and actions of American public and private institutions. Problems, potentials, and alternatives for structuring public and private institutional arrangements to meet the needs of society. Prerequisite: doctoral degree candidate status. (Fall and spring)

321 **Seminar in Strategic Management and Public Policy** (3) Staff
Develops understanding of the major research streams in strategic management and public policy; exposure to theoretical research frameworks and methodological issues and approaches in these areas.

391 **Seminar: Business Management** (3) Staff
Examination of major current issues, both theoretical and empirical, affecting the development of the business enterprise. Topics to be announced. Emphasis on policy and strategic issues affecting the total enterprise. (Offered as the demand warrants)

398 **Advanced Reading and Research** (arr.) Staff
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

399 **Dissertation Research** (arr.) Staff
Limited to doctoral candidates. May be repeated for credit.

TEACHER PREPARATION AND SPECIAL EDUCATION

Professors J.R. Shotel, M.S. Castleberry, R.N. Ianacone, G.L. Horrworth, A.J. Mazur, N.J. Berknap, M.B. Freund (*Chair*), L.L. West, J.M. Taymans, N.B. Paley

Associate Professors S.S. Beck, L.H. Mauro, S.J. Lynch, C.A. Kochhar, K.A. Steeves, L. Hall, A.U. Chamot

Adjunct Associate Professors P. Dupont, G. Tilson, C.M. Gerhard, P. Wald, C. Muskin

Assistant Professors P.S. Tate, M.H. Jarrett, J.E. Neapolitan, F.J. Mosca, V. Youcha, B.C. Browne (*Research*)

Adjunct Assistant Professors C. Rothenbacher, B. Jentleson, P.J. Leconte, C.W. Yates, J.L. Ehrlich, P.A. Bielski, M. Casper, R. Rahamin, R. Bogucki, I. Marston

Adjunct Instructors D.A. Bushong, A.S. Ramsey, T. Krankowski, M.H. Smith, B.A. Lehbrandt, G.D. Caputo, J.T. Hickman, M.E. Roebuck, K.I. Wood, M.J. Ludwig, H.P. Roth, R.E. Seremeth, J. Beam, S. King, C. Ohlson, L. Tredway

See the Graduate School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Master of Education, and Doctor of Education.

TEACHER EDUCATION

Department prerequisite: A bachelor's degree from an accredited institution is prerequisite to all 200-level courses in teacher education.

204 **Perspectives in American Education** (3) Beck, Paley
Historical and social development of education in the United States; evolution of American education related to the growth of the nation and the changing social order; examination of selected issues in contemporary education.

205 **Foundations of Curriculum Development: K–12** (3) Paley
For experienced teachers. Examination of the educational ideas of individuals and groups that have influenced American curriculum theory and practice from the Progressive era through the twentieth century. Comparisons of the issues, models, and principles that have guided curricular thought, development, and innovation. (Summer)

206–7 **Teaching and Learning** (3–3) Mauro, Hall
An overview of the principles of teaching, learning, and related research. Explores ways of knowing, models of teaching, classroom management, and the

dynamic nature of the teaching/learning process. Structured observations and microteaching labs are required. Material fee, $10 per semester

208 **Development and Diversity** (3) Beck and Staff
An examination of student diversity in relation to theories of human growth and development. Investigation of diverse student strengths and needs; the special needs population, the dynamics of inclusion; and intercultural issues related to the teaching/learning process. Material fee, $20.

209 **Reading Children's Literature Across the Curriculum** (3) Tan
Participants read and analyze multicultural children's literature (from folklore to nonfiction) while simultaneously practicing discussion, dramatization, and writing response strategies suitable for involving all students and integrating literature across the school curriculum. (Spring)

211 **Elementary School Curriculum and Methods** (3) Beck, Paley
A comprehensive block course with subsections in mathematics, science, language arts, social studies, and interarts and technology. Integrated with TED 236. May be repeated for credit up to 15 hours. Admission by permission of supervisor. Material fee, $10 per subsection

215 **Recent Developments in Teaching English** (3) Staff
For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective teaching of English. Admission by permission of instructor. Material fee, $20. (Summer)

216 **Recent Developments in Teaching Social Studies** (3) Staff
For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective teaching of social studies. Admission by permission of instructor. Material fee, $20. (Summer)

217 **Recent Developments in Teaching Science** (3) Beck, Staff
For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective teaching of science. Admission by permission of instructor. Material fee, $20. (Summer)

218 **Recent Developments in Teaching Mathematics** (3) Staff
For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective teaching of mathematics. Admission by permission of instructor. Material fee, $20. (Summer)

220 **Selected Topics** (arr.) Staff
Topics and fees announced in the *Schedule of Classes*

221 **Developmental Reading: Emergent Literacy** (3) Hennessy
For educators interested in helping young children get a successful reading start. Seminar discussions focus on research into the sociocultural context of early literacy development, the nature of emergent reading and writing behaviors, and implications for establishing "literate environment" practices in kindergarten classrooms. (Fall)

222 **Foundations of Reading Development** (3) Hennessy
Basic theories and processes of reading acquisition and assessment. Impact of cognitive, developmental, social, and affective bases of reading; influence of media; instructional strategies, including formal and informal assessment. (Fall)

223 **Reading Instruction in Content Areas: Elementary, Intermediate, and Secondary Schools** (3) Hennessy
Emphasis on acquisition and continuing development of content literacy, including integrated methods, media, and teaching demonstrations.

224 **Diagnostic Teaching of Reading: K–6** (3) Hennessy
Classroom teaching and assessment strategies for elementary teachers. Construction of informal traditional and non-traditional reading and writing tests and other instruments of evaluation; selecting and planning activities suited to specific problems. Prerequisite: at least one previous course in reading. (Spring)

226 **Diagnostic Teaching of Reading in Secondary School** (3) Hennessy
Application of instructional strategies and techniques presented in 222, 223, and 224. Construction of informal tests; administering, scoring, and analyzing informal and standardized tests; study and evaluation of assessment and teaching strategies for on grade students and for those with reading problems. (Spring)

227 **Teaching Reading and Writing in English as a Second Language** (3) Chamot
Designed to give the student theoretical and practical knowledge of the development of reading and writing skills in English for K through adult learners who are speakers of other languages. Material fee, $10. (Spring)

233 **Role of the Professional in Early Childhood Education** (3) Staff
Planning, reporting, maintaining records, teacher–child and teacher–family interaction, diagnosis and evaluations, working with paraprofessionals and parents. Emphasis on total classroom environment. (Spring)

234 **Professional Internship in Secondary Education** (3 to 6) Mauro, Steeves, Hall
Supervised internship; required seminar. Admission by permission of instructor. Material fee, $15 per credit hour. (Fall and spring)

235 **Professional Internship in Elementary Education** (3 to 6) Beck, Paley, Tate
Supervised internship; required seminar. Admission by permission of instructor. Material fee, $15 per credit hour. (Fall and spring)

246 **Analysis of Teaching** (3) Steeves
Teaching viewed within a system of local, state, and federal organizations; component aspects are examined with a view toward developing a critical analysis of the role of the teacher. Material fee, $25. (Spring)

247 **Practicum in Early Childhood Education** (3 to 6) Staff
Supervised professional activity in selected early childhood programs; seminar. Prerequisite: 12 credit hours in early childhood education and permission of instructor. (Fall and spring)

438 **Clinical Practicum in Reading** (3 to 6) Horrworth
Supervised clinical experience, including observation and participation in testing, tutoring, and teaching. Clients may include preschoolers through adults. Minimum of 120 clinic hours required. Admission by permission of instructor. Material fee, $25.

TrEd 246 through 251 offer theoretical, curricular, and practical considerations for teaching the content area concerned. Each course requires a 30-hour field experience in a secondary classroom. Prerequisite: TrEd 206–7 and the approved certification course work in the content area (math through calculus in the case of TrEd 250). Material fee, $10 per course. Each course is offered in the fall semester.

246 **Teaching English in Secondary Schools** (3) Mauro
247 **Teaching Science in Secondary Schools** (3) Lynch
248 **Teaching Social Studies in Secondary Schools** (3) Steeves
249 **Teaching Art in Secondary Schools** (3) Staff
250 **Teaching Mathematics in Secondary Schools** (3) Staff
251 **Second Language Instruction** (3) Chamot
275 **The Culturally and Linguistically Diverse Student with Special Needs: Policy, Research, and Trends** (3) Mazur
Same as SpEd 275.

476 **Academic and Psychosocial Assessment of the Culturally and Linguistically Diverse Student** (3) Mazur
Same as SpEd 276.

287–88 **Clinical Study and Treatment of Reading Problems** (3–3) Staff
A case study approach is employed to develop participants' competence to assess and tutor children, adolescents, and adults of diverse backgrounds presenting a variety of reading and writing difficulties. Prerequisite: TrEd 224 and 224. Material fee, $25. (Academic year)

289 **Organization and Administration of Reading Programs** (3) Horrworth
For school administrators and reading teachers. Problems in planning, organizing, and monitoring the total reading program. (Spring)

290 **Severe Learning Disabilities in Reading** (3) Horrworth
The course links the fields of learning disabilities and reading, focusing on their interconnections in terms of etiology, characteristics, diagnosis, and remediation. (Fall)

291 **Reading and Writing Across the Curriculum** (3) Staff
A framework is presented for establishing a whole-language approach. Participants explore principles and strategies for developing students' reading and writing skills in art, literature, social studies, mathematics, and science. (Fall, spring, and summer)

292 **Internship: Reading** (3 to 6) Horrocks
Limited to graduate students in reading education. Experience in a selected area of teaching or supervisory service in field-based programs. Prerequisite: permission of instructor. (Fall and spring) Staff

297–98 **Research and Independent Study** (1 to 3)
Individual research under the guidance of a staff member; program and conferences arranged with an instructor.

308 **Instructional Processes in Teacher Preparation and Special Education** (3) Belknap, Kochhar
Same as SpEd 308. Staff

421 **Practicum in Curriculum and Instruction** (3 to 6)
Supervised field experience in curriculum. Admission by permission of instructor. Prerequisite: TrEd 205. (Fall and spring) Paine

325 **Curriculum Theory** (3)
Examination of reviews and research studies on curriculum theory. Focus on trends, values, interpretations, design systems, and evaluation. Prerequisite: TrEd 205. Foote

345 **Consultation Skills in Teacher Preparation and Special Education** (3) West
Same as SpEd 345. Mason

353 **Post-Master's Internship in Teacher Education** (3 to 6)
Same as SpEd 353. Paine

354 **Doctoral Internship: Teacher Education** (3 to 6)
Same as SpEd 354. Castleberry

370 **Attitude Change and the Access Process** (3)
Same as SpEd 370. Mason

378 **Post-Master's Internship in Curriculum and Instruction** (3 to 6)
Supervised fieldwork for selected experienced teachers. (Fall and spring) Staff

390 **Doctoral Seminar in Curriculum and Instruction** (3 to 6)
Review of literature in a topical area; preparation of a manuscript of publishable quality. Admission by permission of instructor. (Fall) Staff

391 **Dissertation Research** (arr.)
Prerequisite: TrEd 390.

SPECIAL EDUCATION

201 **Overview of Special Education** (3) Staff
Survey course to acquaint prospective teachers with special education terms to help them become aware of the various educational modifications necessary to accommodate children with special needs in a school program. (Fall) Staff

220 **Selected Topics** (arr.)
Topics and fees announced in the *Schedule of Classes*. Freund, Staff

221 **Accessing Community Systems for Individuals with Disabilities** (3)
Overview of access to community systems and service delivery for individuals with special needs and their families. Material fee, $25. (Summer) Kay, Staff

222 **Legal Issues and Public Policy for Individuals With Disabilities** (3)
Examination, interpretation, and analysis of legislation and policies affecting the education and career development of individuals with disabilities. Emphasis on federal and state legislation in the context of national policy related to disability services. Material fee, $25. (Fall) West

226 **Vocational–Technical Education for Special Populations** (3)
Preparation for leadership roles as vocational and technical education and transition personnel; overview of delivery models emphasizing special education. (Spring) Staff

227 **Technology in Vocational Evaluation** (3)
Introduction to an array of assistive technology services and products. Emphasizing professional interventions and vocational evaluation procedures as an introduction to the assessment of persons with disabilities. Material fee, $30. Staff

228 **Community-Based Assessment and Work Sample Development** (3)
Introduction to community-based vocational appraisal methods. Development of job-training analysis skills, labor market surveys, work samples, application of the Americans with Disabilities Act, incorporation of assistive technology. Classroom theory and field work. Material fee, $25.

229 **Interpretation and Application of Academic and Vocational Assessment Information** (3) Staff
Specific strategies and techniques to analyze, interpret, and synthesize assessment information for the development of comprehensive academic/vocational profiles for adolescents and adults with disabilities. Observation and recording procedures, report development, and postassessment conferencing are emphasized. Material fee, $25. (Summer)

230 **Vocational Assessment of Individuals with Disabilities** (3 to 6) Staff
Investigation of vocational appraisal processes and techniques for individuals with disabilities. Includes assessment for transition using field-based assignments. Three credits of practicum experience for students specializing in vocational evaluation. Material fee, $25. (Fall, spring, and summer)

231 **Instructional Methods in Special Education and Transition** (3) Taymans, West
Techniques and processes used in programming for the needs of individuals with disabilities as they prepare for transition to postsecondary programs and employment. Emphasis on skills related to professional liaison and support roles in the design of instructional arrangements and cooperative training. Taken concurrently with SpEd 233. Material fee, $20. (Fall and spring)

232 **Foundations in Special Education, Career Development, and Transition** (3) Kochhar
Overview of historical, theoretical, and philosophical foundations of career development and transition. Explores directions for career development transition practices in the context of social and political change. Material fee, $25. (Fall)

233 **Curriculum in Transition Special Education** (3) Taymans, West
Theory and practice in planning, implementing, and evaluating curriculum for individuals with disabilities. Emphasis on techniques for modifying curriculum and materials for individualized programming. Requires field-site curriculum implementation. Usually taken concurrently with SpEd 231. Material fee, $25. (Fall and spring)

234 **Seminar in Professional Development in Special Education and Transition** (3 to 6) Kochhar
Analysis and development of professional writing and presentation skills. Material fee, $20. (Spring)

235 **Employment Models for Individuals with Disabilities** (3) Staff
Rationale, resources, and programming strategies for the development and coordination of employment programs for individuals with disabilities. Material fee, $25.

236 **Introduction to Career, Vocational, and Transition Services** (3 to 6) West
Introduction to programs that provide career, vocational, and transition services to individuals with disabilities. Material fee, $25. (Summer)

237 **Learning Strategies, Assessment, and Instruction for Learning Disabled Adolescents** (3 to 6) Taymans
Theory and practice in the provision of effective and appropriate educational services to learning disabled adolescents. Material fee, $25. (Spring and summer)

238 **Issues in Educating Individuals with Learning Disabilities** (3) Taymans
Introduction to the academic, cognitive, social, and emotional characteristics of individuals with learning disabilities; etiological theories; educational service delivery models, with particular emphasis on the adolescent with learning disabilities. Policy issues, continuum of services, and the transition from school to post-school environments. Material fee, $25. (Fall and spring)

239 **School Consultation for Professionals Working with Students with Learning Disabilities** (3) Taymans
Exploration of attitudes and beliefs about team teaching, collaboration and inclusionary environments. Development of knowledge and skills related to collaborative consultation and team teaching, interpersonal communication, the dynamics of collaborative teams; examination of the variety of environments in which special educators work. Material fee, $25. (Fall and spring)

240 **Developmental Process of Parenting** (3) Youcha Freund
The developmental process of becoming a parent and ongoing parenting. Material fee, $20. (Fall and summer)

242 **Neurodevelopmental Assessment and Programming for Infants and Toddlers with Disabilities** (3 or 6) Jarrett
Provides students with a theoretical background and practical experience to translate the neurodevelopmental model into techniques for developing and implementing educational programs for infants and toddlers with disabilities. Prerequisite: SpEd 263 or 268 or permission of instructor. Material fee, $30
(Spring)

243 **Developmental Assessment of Infants** (3) Jarrett
Theory and current practice in the assessment of infants with or at risk for developmental disabilities. Material fee, $30. (Fall)

244 **Ethical Considerations in Neonatal and Infant Intervention** (3) Freund
Overview of the major ethical issues involved in neonatal and infant intervention. The impact of recent and emerging technological innovations considered from medical, legal, ethical, and psychosocial perspectives. Material fee, $25
(Spring and summer)

245 **Medical and Developmental Implications for Premature Infants and Their Families** (3) Jarrett
Causes of prematurity and the implications of premature delivery on the infant and family. Specific medical conditions, treatment, long-term developmental implications, intervention, and planning. Material fee, $25. (Spring)

253 **Special Education in Correctional and Alternative Settings** (3) Staff
An introduction to the delivery of special education services within a range of alternative settings and the juvenile justice and corrections systems. Material fee, $25 (Spring)

254 **Special Education in Correctional and Alternative Settings: Field Experiences** (3) Staff
Site visits to local, state, and federal juvenile correction facilities and advocacy organizations, with seminar series to integrate theory and practice. Material fee, $20 (Summer)

255 **Interdisciplinary and Interagency Services Coordination for Special Populations** (3) Staff
Overview of models and strategies for coordinating services across disciplines and among school and community agencies for special populations. Emphasis on interdisciplinary team coordination, communication, decision making, planning, and follow-up for individuals with disabilities. Material fee, $25
(Spring)

256 **Curriculum-Based Methods for Individuals with Disabilities** (3) Staff
Curriculum-based design, implementation, and modification for individuals with disabilities; methodology for individualized programming. Material fee, $25 (Summer)

260 **Developmental Assessment in Special Education** (4) Castleberry, Mason
Examination of formal psychoeducational tests used with preschool and elementary-school aged children. Development of formal and informal assessment techniques. Introduction to the skills necessary to write psychoeducational reports. Material fee, $40. (Fall, spring, and summer) Jarrett, Castleberry

261 **Practicum: Methods and Materials for Young Children with Disabilities** (3 or 6) Castleberry
Clinical practice in design and implementation of educational strategies and materials, including designing and developing teaching materials, classroom teaching, feedback and evaluation with professor. Requires eight hours per week on site. (Fall, spring, and summer)

262 **Formal Assessment of Young Children with Disabilities** (3) Castleberry
Weekly seminar designed to prepare early childhood special educators to integrate formal assessment data into instructional programming. Requires 30 hours with children. Material fee, $40. Prerequisite: SpEd 260 or equivalent.

263 **Development of the Infant with Special Needs** (3) Staff
The processes of normal infant development and interrelationships among areas of development; relationship of these processes to the growth and development of infants with or at risk for developmental disabilities. Material fee, $25
(Fall)

264 **Educational Implications of Medical and Genetic Conditions of the Developmentally Delayed Child** (3) Freund
Specialized programs, techniques, and methods for teaching children with developmental delays or disabilities, emphasis on genetically linked disabling conditions. Practitioner needs and programming concerns are stressed. Material fee, $25. (Spring)

265 **Clinical Experience with Young Children with Developmental Disabilities** (3) Castleberry
Field experience and accompanying seminar for students with limited experience in early childhood special education. Intensive involvement in an early childhood special education setting. (Summer)

266 **The Development of Language in Young Children** (3) Jarrett
Introduction to the study of language acquisition and the development of language programs. Material fee, $10. (Summer)

268 **Development of Young Children with Disabilities** (3) Freund, Youcha
Theories of human growth and development are considered as a framework for examination of typical and atypical development of young children. Material fee, $25. (Fall)

269 **Etiology, Symptomatology, and Approaches to Intervention with Children with Disabilities** (3) Freund
An in-depth examination of the causes and characteristics of various disabilities. Current principles and approaches to intervention are examined. Material fee, $25. (Spring)

270 **Adapting Attitudes, Programs, and Curriculum for Students with Disabilities in the Mainstream Environment** (3) Staff
Meeting the needs of the special needs student in the regular classroom. Material fee, $20. (Spring and summer)

271 **Interdisciplinary Approach to Planning for Children with Disabilities** (3 or 6) Jarrett, Mosca
Interdisciplinary team functioning and service coordination using a systems approach. Organizational development theories, attributes of effective teams, communication, negotiation strategies, and service coordination.

274 **In-Service Planning and Programming** (3) Staff
The continuing professional development of educators, with focus on the design, implementation, and evaluation of in-service training programs. Material fee, $25. (Summer)

275 **The Culturally and Linguistically Diverse Student with Disabilities: Policy, Research, and Trends** (3) Mazur
Issues regarding educational service delivery for the culturally and linguistically diverse student. National, state, and local policies; current research in bilingual education, special education, and bilingual special education. Appropriate assessment techniques, accessing community resources, and characteristics and needs of language-minority students and their families. Same as TrEd 275. Material fee, $25.

276 **Academic and Psychosocial Assessment of the Culturally and Linguistically Diverse Student** (3) Mazur
Issues and implications of second language learning, the relationship between learning disabilities and problems related to adaptation to a different culture. Students review and evaluate formal and nonformal assessment measures and administer bilingual assessment materials. Same as TrEd 276. Material fee, $25.

277 **Teaching the Culturally and Linguistically Diverse Student with Disabilities: Methods and Materials** (3) Mazur
Commonly used tests, formal and informal assessment strategies and preferral interventions, and curricular and classroom management strategies for use with bilingual students who have special needs. Instructional adaptations designed to meet cultural, linguistic, and academic needs in both mainstream and special classes. Material fee, $25.

278 **Internship: Educational Intervention for the Culturally and Linguistically Diverse Student with Disabilities** (3 to 6) Mazur
Supervised internship. Students learn to write culturally relevant IEP programs, conduct effective parent interviews, and relate assessment findings to productive programming. Material fee, $15 per credit hour.

279 **Dynamics of Interaction: The Essence of Relationships Between Teachers and Students** (3) Belknap
An examination of philosophical and psychological theory germane to understanding the nature of human interaction between teachers and students. Material fee, $25. (Fall)

280 **Developmental Assessment of Adolescents** (3) Staff
Formal and informal psychoeducational assessment; assessment instruments commonly used with upper-elementary, junior, and senior high school students; the writing of psychoeducational reports. Material fee, $35. (Spring)

281 **Internship in Teaching Children with Serious Emotional Disturbance: Assistant Teacher** (3) Belknap
A full-time teaching experience with children with emotional disturbance. Graduate students assist in implementing psychoeducational assessment and teaching practices. Daily guidance by on-site training teachers and weekly supervision by University clinical faculty. Weekly seminar accompanies this internship. Material fee, $45. (Fall)

282 **Internship in Teaching Children with Serious Emotional Disturbance: Co-Teacher** (3) Belknap, Mosca
Continuation of SpEd 281. Graduate students become the primary teaching team in the classroom with ongoing supervision. Graduate students plan and apply psychoeducational teaching strategies with children with emotional disturbance. Refinement of instructional and behavior management strategies through the full-time teaching experience. Weekly seminar continues. Material fee, $45. (Spring)

283 **The Urban Setting and Its Impact upon Children with Emotional Disturbance** Staff
The cultural differences and ethnic complexities that face minority children in urban schools. Effects of the total environment in which inner-city children live on their ability to learn, feel, and behave. Material fee, $25. (Fall)

284 **Preparation for Internship in Teaching Adolescents with Serious Emotional Disturbance** (3) Belknap, Mosca
Review and refine program theory and skills of the psychoeducational theory prior to internship. Material fee, $10. (Spring)

285 **Teacher as Consultant: Inclusion of Adolescents with Serious Emotional Disturbance** (3) Belknap, Mosca
Skills and insights pertaining to the consultation process between special education and regular classroom professionals. Consultant process viewed in an ecological systems orientation. Material fee, $35. (Spring)

288 **Characteristics of Serious Emotional Disturbance: Infancy Through Adolescence** (3) Belknap and Staff
An in-depth examination of normal growth and development, psychiatric diagnostic categories, psychosocial development issues, and the nature and needs of the student with serious emotional disturbance. May be repeated for credit. Material fee, $30. (Fall)

289 **Curriculum and Instructional Strategies for Adolescents with Serious Emotional Disturbance** (3 to 6) Belknap
Design, adaptation, and implementation of instructional methods and materials. Material fee, $25. (Fall) Castleberry, Beaknap

290 **Affective Development and Behavior Management in Special Education** (3) Castleberry, Beaknap
Theory, programming, and behavior management strategies from theoretical and practical points of view. Material fee, $25. (Fall and spring) Beaknap and Staff

291 **Behavior Management Practicum: Adolescents with Serious Emotional Disturbance** (3) Beaknap and Staff
Field-based examination of theory of behavior development and techniques for classroom management. Material fee, $25. (Summer) Castleberry, Beaknap

292 **Internship: Teaching Young Children with Disabilities** (3 or 6) Castleberry, Beaknap
Supervised internship in the education of young exceptional children. A minimum of 420 clock hours required. Material fee, $15 per credit hour. (Spring and summer)

293 **Internship: Early Intervention** (3 to 6) Jarrett, Castleberry
Supervised internship in early intervention. Material fee, $15 per credit hour. (Spring and summer)

294 **Internship: Teaching Adolescents with Serious Emotional Disturbance** (6 to 9) Belknap
Full-time placement as a psychoeducator in various roles and sites. Material fee, $90. (Fall, spring, and summer)

295 **School- and Community-Based Internship in Special Education and Transition** (1 to 9) Taymans
A 50- to 450-hour supervised internship in school- and community-based settings involved in career, vocational, and transition services. Material fee, $15 per credit hour. (Fall, spring, and summer)

296 **Teaching Internship in Transition Special Education** (3 to 6) Kochhar, West, Taymans
Supervised teaching internship, seminar required. Permission by instructor. Material fee, $15 per credit hour. (Fall, spring, and summer)

297–98 **Research and Independent Study** (1 to 3) Freund
Individual study or research under guidance of staff member. Admission by permission of advisor. May be repeated for credit.

301 **Research Seminar in Special Education** (arr.) Staff
Participation in a small group with a selected faculty member: research on and discussion of an area of common interest. Admission by permission of instructor. (Spring)

303 **Administration and Supervision of Special Education** (3) West
Philosophy and nature of special education: program organization, administration, and development. Surveying local needs, program evaluation and supervision. Admission by permission of instructor. Material fee, $25. (Summer)

304 **Recent Research and Trends in Special Education** (3) Taymans, Kochhar
Emphasis on topical research issues, problems of conducting research, and procedures and sources for obtaining research funding. Material fee, $25. (Fall and spring)

306 **Dynamics of Family Intervention: Theory and Practice in Special Education** (3) Belknap and Staff
Theoretical foundations and clinical techniques necessary for the special educator to collaborate with parents of adolescents with serious emotional disturbance. Material fee, $25. (Fall and spring)

308 **Instructional Processes in Teacher Preparation and Special Education** (3) Belknap, Kochhar
Philosophical and methodological aspects of staff development and university programs; opportunities for practice in needs assessment, program design, and instruction. Admission by permission of instructor. Material fee, $20. (Spring)

343 **Psychoeducational Diagnosis in Special Education** (3) Staff
The range of diagnostic and intervention strategies applicable to the student who presents psychosocial and related learning difficulties. Admission by permission of instructor. Material fee, $25. (Spring)

345 **Consultation Skills in Teacher Preparation and Special Education** (3) Shotel, West
Consultation models from organizational development, organizational psychology, and mental health applied to professional practice in education and special education. Material fee, $25. (Spring)

352 **Seminar: Legal Issues and Public Policy Concerns for Individuals with Disabilities** (3) Kochhar
Overview of current legislation and public policy affecting education, employment, and civil rights of individuals with disabilities. The emergence of disability policies; policy directions in the context of current and future educational reforms. Material fee, $25. (Summer)

353 **Post-Master's Internship in Special Education** (3 to 6) Freund, Taymans, West
Supervised professional internship in college teaching, administration, supervision, research, or policymaking. Internships are individually arranged. Admission by permission of instructor. (Fall, spring, and summer)

354 **Doctoral Internship: Special Education** (3 to 6) Freund, Kochhar
Supervised professional internship in college teaching, administration, supervision, research, policymaking, or private agency function. Each internship is individually arranged. Admission by permission of advisor. (Fall, spring, and summer)

360 **Interdisciplinary Techniques in the Diagnostic Process in Special Education** (3)
Application of theoretical concepts of assessment; development of assessment programs; interpretation and application of interdisciplinary diagnostic evaluations. Prerequisite: SpEd 260 or equivalent, and permission of instructor. Material fee, $25. (Fall)

370 **Attitude Change and the Access Process** (3)
Consideration of psychosocial constructs germane to the role of the consultant/administrator in educational and interdisciplinary settings. Application of theory in accessing human service delivery systems. Material fee, $25

390 **Doctoral Seminar in Special Education** (3 to 6)
Review of literature in a topical area; preparation of a manuscript of publishable quality. Admission by permission of instructor. (Fall)

391 **Dissertation Research** (arr.)
Prerequisite: SpEd 390

TELECOMMUNICATION

Professors C.H. Sterling, G. Brock (*Director*)
Professorial Lecturers J.C. Baker, R.M. Finn, R.J. Oslund, L. Darby, R.S. Belous, D.R. Harris
Associate Professorial Lecturer A. Barna
Assistant Professor E.K. Ralph

Columbian School of Arts and Sciences, in cooperation with the School of Engineering and Applied Science, offers a multidisciplinary program leading to the degree of Master of Arts in the field of telecommunication. The program focuses on the interaction of technology, economics, management, and both corporate and governmental policymaking in the common carrier and media industries.

Master of Arts in the field of telecommunication—Prerequisite: a bachelor's degree with a *B* average from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences, including at least 36 credit hours of course work. Required courses for the degree include Econ 217 and 249; EE 450 and 451; TCom 201, 230, 231, 240, 241, 250, and 252; electives selected with a faculty advisor, typically chosen from TCom 220, 224, 235, 242, 452; and Mgt 282. Each student must pass a Master's Comprehensive Examination. A thesis option is available.

201 **Development of the Telecommunication Industry** (3)
Development of telecommunication technology, industry, and policy in the United States, stressing interrelationships among industry, government bodies and policies, and users.

220 **Technology and Telecommunication Policy** (3)
National and international policy issues that arise from the interaction between scientific and technological development in the telecommunication industry and government policies. Prerequisite: TCom 201.

224 **Telecommunication Regulation** (3)
Background, current status, and trends in regulation of common carrier and electronic media. Legislative, FCC, and judicial decisions and trends. Emphasis on the process of federal regulation, with case studies. Prerequisite: TCom 201

230 **Principles of Telecommunication Management** (3)
Fundamentals of daily telecommunication operations, including human relations in organizations, acquisition and procurement, research and development, logistical planning, and relations with carriers and manufacturers.

231 **Telecommunication Management and Marketing** (3)
Strategic planning in regulated and competitive telecommunication industries; managing and marketing a technology-based business; different management and marketing approaches and their strengths and weaknesses; legal and ethical constraints: responsibilities and ethics. Prerequisite: TCom 230

235 **Telecommunication Finance** (3)
Principles and methods of asset valuation; measurement and interpretation of financial flows, financial statements, risk assessment, capital structure, capital budgeting, effects of economic regulation on capital formation. Prerequisite: Econ 217 or permission of instructor.

240 **Seminar in Domestic Telecommunication Policy** (3)
Interaction of private and public policy in telecommunication: research and development, market entry, competition, ownership and acquisition, regulation, business decisions, and social impact. The course is intended for degree candidates in their final year of study in the telecommunication program.

241 **Seminar in International Telecommunication Policy** (3)
Role and process of U.S. and international telecommunication organizations, system authorization and utilization, transborder data flow and New World Information Order, barriers to trade in information equipment and services, regional facilities planning process, and development of competition.

259 **Applications of Economics in Telecommunication** (3)
Structure, interrelationship, and function of the telecommunication industry within a changing regulatory framework. Prerequisite: Econ 249.

297 **Special Topics** (3)
Special topics in technology, economics, operations, or policy. May be repeated for credit once provided the topic differs. Prerequisite: TCom 201 and permission of instructor.

298 **Independent Study** (1 to 3)
Prerequisite: permission of instructor.

299–300 **Thesis Research** (3–3)

THEATRE AND DANCE

Professors M.R. Withers, A.G. Wade, L.B. Jacobson (*Chair*)
Associate Professors N.C. Garner, W.A. Puclowsky
Assistant Professors B.W. Sabelli, C.F. Gudemus, J. Mills, S. Wolf

Master of Fine Arts in the field of theatre with a concentration in theatre design—Prerequisite: the degree of Bachelor of Arts from this University, or an equivalent degree. Required: the general requirements stated under Columbian School of Arts and Sciences. The program of study consists of 54 credit hours of 100- and 200-level course work in theatre and dance and in art, planned in consultation with the advisor, including a creative thesis (TrDa 299–300). The program may be planned to emphasize scenery, lighting, or costume.

For listings of 100-level courses, see the Undergraduate Programs Bulletin.
Prerequisite to all 200-level courses: M.F.A. candidacy or permission of instructor.

231 **Lighting Design** (3)
Theory and execution of lighting design for theatre and dance. Prerequisite: TrDa 131. May be repeated for credit. (Spring) Gudemus

233 **Architecture of Theatre and Exhibit Spaces** (3)
Theatrical architecture from a historical perspective. Traditional and nontraditional exhibit, theatrical, and assembly spaces are examined and evaluated with reference to the functional use of space from practical, architectural, and aesthetic perspectives. Studio work includes design of a hypothetical performance space and its auxiliary units. Sabelli

234 **Scene Design: Renderings** (3)
Preparation for the advanced student designer, with emphasis on the individual development of rendering techniques including computer graphics practical design applications, traditional script analysis, and original scenographic interpretations. May be repeated once for credit. (Fall, even years) Sabelli

235 **Scene Design: Model Making** (3)
Exploration of all styles of traditional and contemporary scenography through the making of scale models. May be repeated once for credit. Admission by permission of instructor. (Spring) Puclowsky

236 **Intermediate Costume** (3)
Introduction to the basic techniques of costume design through specific projects. Various rendering techniques will be explored, consistent with the historical period concerned. May be repeated for credit. Prerequisite: TrDa 146. (Spring, odd years) Puclowsky

247 **Advanced Costume** (3)
Study of special design, style, and construction problems. May be repeated for credit. Puclowsky

238 **Pattern Making** (3)
The study of pattern drafting and draping methods, based on contemporary and historical clothing, through lecture and class work. Prerequisite: TrDa 136 (Spring, even years)

291 **Internship** (3 or 6)
Internships with theatre companies or arts organizations, including conference and/or seminar. May be taken for a total of 6 credit hours.

292 **Selected Topics** (1 to 3)
May be repeated for credit.

294 **Independent Research** (arr.)
May be repeated for credit.

299–300 **Thesis Research** (3–3)

TOURISM AND HOSPITALITY MANAGEMENT

Professor D.E. Hawkins (*Director*)
Adjunct Professor J. Burke
Associate Professors D. Frechtling, L. Yu
Assistant Professors L.A. Delpy, J.J. Goldblatt, S.E. Spivack
Adjunct Assistant Professor S.D. Cook
Adjunct Instructors B. Dwyer, D. Farrell

See the School of Business and Public Management for programs of study leading to the degree of Master of Tourism Administration and Master of Business Administration. For further information on the five-year, dual-degree program leading to the Bachelor of Business Administration and Master of Tourism Administration, see the Undergraduate Programs Bulletin.

230 **Organization and Management of Airlines** (3)
Overview of domestic and international passenger air transportation systems. Analysis of planning, financing, operating, marketing, and evaluating transportation systems. Legal and regulatory aspects of airline operations. Development of infrastructure and related support services. (Spring)

249 **Economic, Cultural, and Environmental Aspects of Tourism** (3)
Relationship of tourism and sustainable development, specific emphasis on cultural, environmental, and economic impacts and trends. (Fall and spring)

250 **Administration of Tourism and Hospitality Services** (3)
Organization and management concepts, theory, and issues, stressing application of theory through analysis of case examples drawn from the tourism and hospitality industry. Prerequisite TStd 104 or equivalent. (Fall)

260 **Tourism Development** (3)
Relationship of economic theory and planning principles to tourism development; application of pre-feasibility analysis to tourism projects. (Spring)

261 **Tourism Planning** (3)
Integrated planning for tourism organizations; development of comprehensive tourism projects; consideration of basic concepts, approaches, and models. (Summer)

262 **Tourism Policy Analysis** (3)
Components of tourism policy, including development of tools for tourism policy analysis and description of tourism organizations in the government and private sector. (Spring or summer)

263 **Tourism Marketing** (3)
Concepts and techniques employed in marketing travel industry products and services, including its public- and private-sector components. Assessment of the tourism product, development of marketing strategy, preparation of a marketing plan, and analysis of promotional programs. (Fall)

264 **Sport Marketing** (3)
Application of marketing theories to sport events and properties. Case studies of marketing athletes, sport products, and events as well as using sports as a marketing tool for products. Writing sponsorship and endorsement proposals and incorporating sport into an integrated marketing plan. Prerequisite: TStd 230 or equivalent. (Fall)

265 **Sport Law: Contracts and Negotiations** (3)
Examination of legislation and specific case law as related to professional and amateur athletes, sport events, licensed merchandise, broadcast and media

ship rights. Topics include labor and anti-trust law; contract negotiation, specifications, and interpretation (Spring)

270 **Tourism Research** (3)
Frechtling
Analysis of specific research methods and tools and their application to the study of tourism. (Spring)

277 **Event Management** (3)
Goldblatt
An introduction to the theoretical and practical foundations of event management. Fundamentals of planning, budgeting, and evaluating events (Fall)

278 **Conference and Exposition Management** (3)
Goldblatt
Site selection, program planning and management, exhibits, selection and use of facility, volunteers, and budget management (Spring)

280 **Advanced Workshop** (1 to 6)
Staff
Workshops with emphasis on contemporary issues and opportunities; development of advanced professional competencies. May be repeated for credit with permission of advisor. (Fall, spring, or summer)

282 **International Experience** (1 to 6)
Staff
Travel to a foreign country for study of specific topics. May be repeated for credit with approval of advisor (Fall, spring, or summer)

283 **Practicum** (3)
Staff
For graduate students enrolled in a degree program or field offered through the department. Fieldwork, internship, and/or instructional practice, including conference and/or seminar. May be repeated once for credit with permission of advisor. (Fall, spring, and summer)

290 **Special Topics** (3)
Staff
Experimental offering, new course topics and teaching methods. May be repeated once for credit

296 **Travel Information Management Systems** (3)
Staff
Database utilization, information analysis, reservation systems, computer applications including the Internet, and related travel management systems (Fall)

297 **Advanced Topical Studies** (3)
Hawkins, Burke
Required capstone experience for tourism administration students who do not select the thesis option. Analysis of case situations involving policy formulation or management decision making, emphasis on applied strategic planning and management approaches.

298 **Directed Reading and Research** (3)
Staff
Supervised readings or research. Admission by prior permission of instructor. May be repeated for credit

299 **Thesis Seminar** (3)
Staff

300 **Thesis Research** (3)
Staff

UNIVERSITY PROFESSORS

University Professors A. Etzioni, P.J. Caws, S.H. Nasr, K.F. Schaffner, J.N. Rosenau

Courses numbered in the 770s and 780s are taught by distinguished scholars who hold appointments as University Professors. With the approval of the department or program chair, appropriate University Professor courses may be taken to satisfy degree program requirements. Permission of the University Professor may be required for enrollment. A complete listing of courses offered each semester appears in the *Schedule of Courses* under the 700 series. Following is a list of courses that are expected to be taught regularly by University Professors.

Antipo

770 **Turbulence in World Politics** (3)
Rosenau
An effort to probe the sources and dynamics of change and continuity in local, national, and international affairs. The links between the orientations of individuals and the actions of collectivities are a major focus, along with the foundations of authority under transformative conditions. For graduate students; open to upper-level undergraduates.

Caws

772 **Political Aggregation** (3)
Rosenau
An exploration of how collective action is fashioned out of the input of individuals, how collectivities become larger than the sum of their parts, and how

political organizations manage to persist through time. Socialization, mobilization, momentum, and bandwagon effects are among the concepts evaluated. For graduate students; open to upper-level undergraduates.

IAff/PSc Rosenau
772 **The Dynamics of Globalization** (3)
An inquiry into the economic, cultural, and political processes through which individual and community life is expanding as awareness encompasses factors on a global scale. The consequences of this expansion at both global and local levels is examined, along with the possibility that these levels interact. For graduate students; open to upper-level undergraduates.

IAff/PSc Rosenau
773 **Global Governance** (3)
An inquiry into the prospects for and problems of governance on a global scale in the era following the end of the Cold War. Informal forms of governance as well as those that have undergone institutionalization. For graduate students; open to upper-level undergraduates.

HmSc Cave
771 **The Cinema of Morals/The Morals of Cinema** (3)
Vicarious moral experience in the cinema, examples of such experience in film and the moral arguments they provoke; the power of cinema as a shaper of moral sentiment; moral issues in the production and distribution of films. For graduate students, open to undergraduates.

Phil Cave
772 **Individualism** (3)
The concept of the free individual in philosophy, psychology, literature, and politics; individuals and groups; individualism and collectivism; exemplary individuals in biography, autobiography, and fiction; problems of individual and collective agency and identity. For undergraduates; open to graduate students.

Phil Cave
774 **Understanding Technology** (3)
The idea of technology—its relation to the sciences and the arts and humanities, its development, and its problems. Technology will not be regarded as merely dependent on the sciences or as merely useful (or dangerous) but as a human activity in its own right, with its own history, conceptual structure, interests, risks, and benefits. For undergraduates; open to graduate students.

Phil Cave
778 **Left and Right in Philosophy and Politics** (3)
A fundamental inquiry into the concept of the state in terms of such oppositions: individualism/collectivism, equality/liberty, liberalism/conservatism, socialism/free enterprise, communism/capitalism. Emphasis on the present need to find a constructive transcendence of these oppositions. For graduate students; open to undergraduates.

Phil
779 **Philosophy and Psychoanalysis** (3)
An exploration of some striking parallels between the topics addressed by Freud's psychoanalytic theories on the one hand and the traditional concerns of philosophical reflection on the other, with special emphasis on the relations between cognitive theory and therapeutic practice (in both disciplines). For graduate students; open to undergraduates.

HCS/Phil
770 **Philosophy of Medicine** (3)
An introduction to philosophical issues in medicine: medicine, science, progress, the doctor–patient relationship, whether diseases are culturally conditioned entities, clinical reasoning using some simple models, medical diagnosis and new drug testing, and ethical and social issues posed by the AIDS epidemic. For undergraduates; open to graduate students.

771 Philosophy of Biology (4)
An introduction to philosophical issues in biology, including evolutionary biology (Darwinian and neo-Darwinian), molecular biology and reductionism, teleology, philosophical implications of the neurosciences, sociobiology, and evolutionary ethics. For undergraduates; open to graduate students. Schaffner

HCS/Phil

773 Introduction to the Medical Humanities (3)
Practical ways in which the humanities can assist problem solving in medicine and health care. Philosophical theories of medicine and health care, the role of literature in modeling ethical deliberation, and the roles of religious and humanistic values in a secular decision-making environment. For undergraduates and medical students; open to graduate students. Schaffner

HCS/Phil

775 Ethics and Health Policy (4)
The problem of health care reform and ethical issues associated with managed care and competition. Medicare and Medicaid reform, and the issue of health care rationing. Issues relating to the "right to die," including active and passive euthanasia and doctor-assisted suicide. For graduate students; open to undergraduates. Schaffner

HCS/Phil

777 The Human Genome Project: Ethical, Legal, and Social Implications (3)
Ethical, legal, and social implications of the plan to sequence the entire human genome by the year 2005, including confidentiality of genetic information, genetic discrimination and insurance, reductionistic and deterministic implications of the project, the role of public opinion, and research priorities in health care. For graduates and medical students; open to undergraduates. Schaffner

Phil

780 Neurobiology and Reductionism (3)
Recent developments in neuroscience, including neural networks, philosophical implications, including the relations among genetics, brains and consciousness. There are no specific prerequisites, but some experience in neuroscience, neural networks, or the philosophy of science is desirable. For graduate students; open to qualified undergraduates. Schaffner

Rel

770 Islamic Civilization and the West (3)
The encounter of Islam and the West, from the rise of Islam to modern times. Investigation of the impact of Islam on European philosophy, science, art, and literature; influence of the West and Western scholarship on the Islamic world. For juniors and seniors; open to graduate students. Nasr

Rel

771 Persian Sufi Literature in East and West (4)
The writings of major Persian Sufi poets and writers, such as Khayyam, Attar, Rumi, Shabistari, and Hafiz, and their impact on the West and on India. The translation of these works into European languages and their influence upon such figures as Goethe and Emerson are discussed. Assigned readings in English. For undergraduates; open to graduate students. Nasr

Rel

772 Mysticism—East and West (3)
A comparative examination of mystical traditions; the nature of mysticism; approaches to the ultimate reality; the mystical significance of the cosmos; the mystical science of the soul; and the significance of sacred art and symbols. Major mystical traditions of East and West—Hinduism, Taoism, Buddhism, Judaism, Christianity, Islam. For undergraduates; open to graduate students. Nasr

773 Perennial Philosophy (3)
The basis of perennial philosophy as developed in the 20th century by A. Huxley, A.K. Coomaraswamy, and others. Doctrines and teachings of perennial Nasr

philosophy as found in various religious and philosophical traditions of East and West. Prerequisite: at least one course in religion, philosophy, or intellectual history. For undergraduates; open to graduate students.

Rel — Nav

775 **Man and the Natural Environment** (3)
The religious, philosophical, and scientific causes of the present environmental crisis. The history of religious and philosophical attitudes toward nature in the West, the history of Western science, and some non-Western world views that may encourage a more harmonious relationship between man and the natural environment. For undergraduates; open to graduate students

Rel — Nav

777 **Religion and Science** (3)
The interaction between religion and science in ancient Egypt, classical Greece, Islam, India, China, and the West, from the Renaissance, the scientific revolution, and up to the present day. Key concepts and issues in the encounter of religion and science in light of the cultural matrix of the civilization and period in question. For juniors and seniors; open to graduate students

Soc — Etzion

776 **Public Policy Research** (3)
Basic concepts of policy research in comparison to basic and applied research. Policy research methods. The social structure of policy research: producers and consumers of knowledge and issues arising among them. Open to undergraduates and graduate students with permission of the instructor. Prerequisite: social science or public policy course work or related experience

Soc/Econ/PSc — Etzion

779 **The Elements of Socioeconomics** (3)
A synthesized approach to the study of economic behavior and economic policy, drawing on relevant segments of economics and sociology as well as political science and psychology. A discussion of ethical assumptions and core concepts in the study of micro- and macroeconomic behavior and their policy implications. For graduate students; open to qualified undergraduates

Soc/PSc/IAff — Etzion

781 **Elements of Communitarian Thinking** (3)
An examination of the roots of communitarian thinking in earlier philosophical work, current political theory, and historical and contemporary social movements. The relevance of communitarian thinking to various community-building efforts. For graduate students; open to undergraduates with permission of instructor

Soc/PSc/IAff — Etzion

782 **Elements of Public Policy in Communitarian Perspective** (3)
The issues that arise when communities seeking to advance their goals run afoul commitments to individual and minority rights. Freedom of speech and hate codes, public safety and protection against search and seizure, majority rule and minority rights, and other policy issues. For graduate students; open to undergraduates with permission of instructor.

VIRGINIA CAMPUS

With an emphasis on graduate education and research, The George Washington University offers academic programs on its Virginia Campus. The School of Engineering and Applied Science, School of Business and Public Management, and Graduate School of Education and Human Development offer graduate study leading to master's and doctoral degrees at this site. The Virginia Campus offers extensive library and research facilities networked by computer to information databases nationwide.

Through the School of Business and Public Management and the Graduate School of Education and Human Development, the three executive programs [illegible] are offered on the Virginia Campus. In addition, the School of Engineering and Applied Science offers course work leading to master's and doctoral degrees in several fields, including an accelerated weekend program leading to the Master of Science in the field of telecommunications and computers.

Academic programs on the Virginia Campus are extensive and growing. Please note that programs listed here include only those that are exclusive to the Virginia Campus. Programs offered at this and other sites are listed by academic department. Contact the Virginia Campus office for complete information on programs at this site.

EXECUTIVE MASTER OF SCIENCE IN INFORMATION SYSTEMS TECHNOLOGY

Executive Master of Science in Information Systems Technology—A unique, weekend-oriented program for high-potential, mid-level managers and senior executives, offered by the School of Business and Public Management. The 36-credit-hour, multidisciplinary curriculum focuses on the role of information systems and behavioral and decision sciences in problem solving and decision making. The program is designed to meet the needs of individuals from a variety of professional and educational backgrounds. Applicants generally are expected to have a minimum of seven years of professional experience and a bachelor's degree with a *B* or better average from an accredited college or university. Program participants represent a broad range of public and private sector organizations; they hold positions that include president, senior marketing specialist, division director, senior engineer, program manager, and consultant.

The program enrolls one student cohort per year, which undertakes a fixed sequence of courses during the 15-month accelerated program. Classes meet on alternating Fridays and Saturdays. The faculty consists of a core of full-time professors, augmented by recognized leaders in particular disciplines and distinguished guest lecturers from government and industry.

The management science courses listed below are offered at the Virginia Campus only and are available to Executive Master's students only.

MANAGEMENT SCIENCE

401 **Individual and Group Decision Processes** (3)
Study of the individual and group processes in decision making in organizations. Topics include decision effectiveness, decision analysis techniques, risk analysis, and managerial style as related to decision making.

402 **Quantitative Methods for Information Systems** (3)
Introductory study of quantitative techniques for problem solving. Statistical concepts, including confidence intervals, hypothesis testing, correlation, and regression. Linear programming. Applications and case studies involving management information systems.

403 **Information Engineering and CASE Tools** (2)
The design of information systems as evolved via information engineering principles and computer-assisted software engineering tools. Data attributes, data modeling, and object-oriented programming.

404 **Enterprise Networks in Organizations** (3)
The role of data communications and networking within organizations. LANs and interconnecting LANs to create enterprise networks. Emerging technologies such as videoconferencing, multimedia, and ATM. The interface between networks and MIS as typified by client-server architectures is emphasized.

405 **Database Systems** (3)
Application and implementation of database management systems in the public and private sectors. Database organization, creation, maintenance, and management. Client–server technology. Review of commercial database management systems.

406 **Decision Support and Expert Systems** (2)
Computer-based decision-making aids and simulations. Issues in effective implementation of decision support systems. Review and analyses of various expert systems, including tools and generators, classification vs. diagnostic type systems, and building modules. Design of decision support and expert systems.

407 **Introduction to MIS Business Relationships** (3)
Introduction to MIS business solutions. Integration of MIS into the business and organizational environment. Case studies of various organizational structures and MIS needs and solutions. Economic analysis of MIS applications.

408 **Strategic Planning and Business Process Engineering** (3)
Development and implementation of a long-range organizational strategy. Business process engineering and re-engineering. Technology assessment and technical management, use of critical success factors. Innovative uses of MIS in organizations.

409 **Workshop in Decision Support Systems** (3)
Individual and group decision support systems. Use of the Management Decision Center to investigate group dynamics in decision making. Methods of dealing with unstructured and underspecified problems from management and organizational perspectives. The role of the facilitator in group decision making.

410 **Information Systems Security** (2)
Network and MIS security issues. Risk assessment, technological and procedural security measures. Computer fraud and privacy issues. Hacker attacks, phone fraud, denial of service, and virus and work attacks.

411 **Information Systems Design** (3)
Introduction to the design and analysis of information systems. The systems development life cycle, analysis of requirements, design of logical systems, analysis and design of user interfaces, system documentation and specifications. Planning for system implementation, evaluation, and maintenance.

412 **Managing the Information Systems Development Process** (3)
Management decisions and activities during the life cycle of an information system. Project estimation and planning for information systems. Contractual issues in system development and acquisition. Requirements analysis, systems analysis, development, testing, and maintenance. Rapid prototyping, system model development, and alternative development strategies.

EXECUTIVE MASTER OF BUSINESS ADMINISTRATION

The *Executive Master of Business Administration* is an intensive program for mature leaders to enhance competitiveness in business. The program draws students from consulting, telecommunications, finance, biotechnology, and many other industries as well as the public sector, including international agencies. Open to mid- and senior-level managers with at least ten years of professional experience, this unique program offers a fast-paced, integrated curriculum specially designed to encourage an environment for lively exchange between participants and the faculty. The curriculum involves courses developed from all major disciplines of the School of Business and Public Management, including marketing, finance, operations management, science, information systems management, and international business. The program focuses on the growing role of technology and society of global markets, emerging technologies, and the changing workplace. Meeting one day per week on alternating Fridays and Saturdays, the Executive MBA allows participants to continue their careers while they study and master a broad range of skills. Classes of approximately 45 students operate as a cohort, with all courses taken in lockstep fashion over a 21-month period, comprising four academic semesters. The 60-credit hour program includes three one-week residencies, and a fourth one-week residency held abroad.

The courses listed below are available only to degree candidates in the Executive Master of Business Administration program.

202 **Organization, Management, and Leadership** (3)
Integrates organizational concepts with management principles and theories applied to public and private organizations. Management thought, functions, and practices. Current management approaches and future challenges. Issues in managerial leadership, leadership issues, and problems in organizations at higher levels.

210 **Managerial Economics** (3)
Intermediate-level micro- and macroeconomic theory and its application to public and private-sector decision making. Demand, production, cost, and investments, market structure and strategy, and market outcomes. Interaction of economic conditions and theory and practice of monetary and fiscal policy.

212 **Business and Public Policy** (3)
The political, legal, economic, social, and ethical forces that act on business. Interaction of the market system and public policy process in the development of law and regulation. Along with the evolving relationship of business and government in American society.

214 **Fundamentals of Decision Science and Computational Methods** (3)
Theory and methods of business decision making, including problem recognition and choice. Useful approaches in cases of single-person choice, including salary and non-compensatory decision approaches, uncertainty, and risk. Use of analytical models and quantitative and qualitative measurement scales.

216 **Marketing Management** (3) Dyer
The marketing process from the firm's viewpoint. Market analysis, product planning, channels of distribution, pricing, and promotion. Approaches to financial, operational, and international market considerations. The impact of environmental and other business forces on marketing practice.

220 **Management of Operations and Manufacturing Strategy** (3) Baghai
Fundamentals of production and operations management and the associated tools and techniques used in decision making. Resource allocation, capacity management, and production planning and control. Technology-related developments, such as flexible manufacturing systems and computer integrated manufacturing.

222 **Financial Accounting** (3) Singleton
The role of accounting in the decision-making process of management and external parties. Interpretation of financial statements for the guidance of management. Interpretation and implementation of financial accounting.

224 **Theory and Concepts of Finance** (3) Handorf
Long-term financing and current operations, investment decisions, and dividend policy. Financial analysis, business theory, and policy and practice in financial management. The role of capital formation and the relationship of public policy and the structuring of interest rates.

226 **The Changing World Community: Implications for the Global Economy** (3) Lauter
The global competitive framework and how nations develop and sustain competitive advantages. The role of the multinational firm, the economic transformation of the Eastern European nations, and the internationalization of the Japanese economy with reference to the United States.

230 **Competitiveness and Corporate Innovation** (3) Donnelly
Business, technological, economic, and political factors influencing the development of new products. Competitiveness and joint ventures, both locally and globally, involving technological innovation and transfer. Enhancing organizational innovation: product concept development, technology marketing, and corporate venture divisions.

240 **International Business Strategy and Practice** (3) Askari
The changing international environment and its impact on domestic and foreign firms. Multinational corporations. International finance, marketing strategy, negotiations, and product policies. The economic, cultural, and political aspects that influence market conditions.

250 **Financial Decision Making in Firms and Markets** (3) N. Cohen
Decisions made by financial managers about working capital, fixed assets, and sources of financing in the context of world wide business operations. Examines securities markets from the dual viewpoints of the company as a user of capital and investors as suppliers of capital. The relationship of risk and return and the value of securities.

252 **Power, Politics, and Ethics** (3) Chiravuri, Kee
Ethical judgments of corporate professionals, managers, and public officials. Problems and alternatives for private and public institutional arrangements to meet the needs of society. Concepts and strategies of ethical analysis are applied to specific problems, such as risk management, plant relocation, and preemployment hiring.

254 **Managerial Accounting** (3) Lindahl
The use of accounting in the management decision making process. Costing systems, cost behavior analyses, responsibility accounting, and volume-profit relationships. Budgeting for financial planning and control, pricing and product mix decisions.

257 **Entrepreneurship and Creation of New Ventures** (3) Staff
The process of innovation and entrepreneurship in the creation of new ventures. Access to venture capital, tax considerations, marketing new products and services. Approaches to managing small ventures, including technology-based ventures, and management for venture innovation in large and small organizations.

Human Resource Management (3) Swartz
Interpersonal and group dynamics in various organizational settings; direct managerial intervention in the process of organizational development. Issues

and opportunities in managing outside one's own culture, executive selection and development, current personnel management practices and procedures. Cavanaugh

262 **Information Systems in Management** (3)
A management-oriented survey of current and developing information technologies, including hardware, software, and systems development. The impact on management of the computing milieu. Information systems requirements and multimedia database approaches to handling data for business decision-making. Soyer

263 **Executive Decision Support** (2)
Theory and methods of decision making in business and organizational situations. Judgmental forecasting, including statistical modeling, forward/backward planning process, conflict resolution, quality management, and value assessment. Use of computational tools, including spreadsheets, in forecasting. [Not...]

264 **Marketing Strategy** (3)
Complex marketing problems involving policy and operational decisions. Marketing strategies in the perspective of environmental forces and business functions. The marketing research process. Marketing of intangibles and new and existing services, including service product decisions and planning. Staff

266 **Advanced Topics** (2)
Problems in international finance, including the evolving international payments system and effective business practice regarding the international financial markets. International business strategies for the fast-growing economies of Southeast Asia, China, and Latin America. Strategic alliances, market entry, trade and investment, government relations, and business operations. Cavusgil

270 **Strategy Formulation and Implementation** (3)
Approaches to formulating strategies that enable organizations to adapt to changing social, technological, economic, and political conditions. Strategic management from the general manager's perspective, evaluation and control of strategy in various types of organizations.

EXECUTIVE LEADERSHIP IN HUMAN RESOURCE DEVELOPMENT

Doctor of Education in the field of human resource development—Prerequisite: A master's degree from an accredited college or university, three years of full-time experience in human resource development, and the general requirements for admission to Ed.D. degree candidacy stated under the Graduate School of Education and Human Development.

The program provides a forum through which doctoral Fellows, their organizations, and the University can build leadership in human resource development and bring about significant change within cooperating organizations. Fellows move through the program as a cohort group. Each cohort is a deliberate mixture of professionals from diverse industries as well as government and from a variety of geographic locations across the United States.

The program focuses on six themes that correspond to semesters, followed by work toward the dissertation. Class sessions are held one weekend a month (Friday and Saturday) for a period of two and a half years. A week-long session begins the program and an additional two-week session takes place each subsequent year. The specific time period for completing the dissertation varies.

Leadership—Fellows gain an understanding of pivotal theories of leadership and apply these theories to their own organizations. Empowerment, team development, change, and systems thinking are explored. There is an emphasis on the personal leadership development of the Fellows within the program.

The Learning Organization—Fellows focus on learning at both the individual and system level. Learning theory, critical thinking, and organizational learning are explored. Fellows engage in action learning projects that address a problem within their own organizations.

Research—Fellows survey the depth and breadth of current research in human resource development, focusing on areas of particular interest to themselves and their organizations and developing research skills in both quantitative and qualitative methods.

The Changing Environment—Fellows address current change theory and practice. Leading and implementing of change in an organizational setting. Forces influencing change such as diversity and globalization are examined.

Integration and Application of Central Concepts—Fellows seek to integrate the knowledge they have gained in the program by applying it to a project within their own

exchange organization. This process serves both to provide a real-world application of their knowledge and an opportunity to expand it.

Specialization. Developing In-Depth Knowledge—Fellows focus on one or two specific areas of study relevant to their organizations, themselves, and the field. Examples of topic areas are the impact of technology, autonomous work teams, retraining the workforce, or the implementation of total quality management.

Fellows are required to research, write, and defend a dissertation. This research effort is an opportunity for each Fellow to make a significant contribution to the field of human resource development. The student continues to register for Dissertation Research (HRD 391) until the final oral examination has been successfully completed.

WOMEN'S STUDIES

Associate Professors P.M. Palmer, B.D. Miller (*Director*), C.E. Harrison, C. Deutch
Associate Professorial Lecturer C.A. Douglas
Assistant Professorial Lecturer B. Morris
Lecturer N. Turner

Committee on Women's Studies

N. Cahn, M.M. Cassidy, C. Deutch, C.E. Harrison, S. Lynch, B.D. Miller, D. Moshenberg, T. Murphy, P.M. Palmer, A. Rommes

Columbian School of Arts and Sciences offers two interdisciplinary programs leading to the degrees of Master of Arts in the field of women's studies and Master of Arts in the field of public policy with a concentration in women's studies. Both are directed by the Committee on Women's Studies and draw upon faculty from various departments within the University and resource persons in the community.

The women's studies programs examine and integrate the contributions of established academic disciplines to provide an understanding of the historical and contemporary role and status of women, and to provide training necessary to evaluate and formulate equitable public policy for women. Each student will work closely with an advisor in designing a program to meet individual research interests and professional goals. Prospective degree candidates should consult with the director of the Women's Studies Program.

Master of Arts in the field of women's studies and *Master of Arts in the field of public policy with a concentration in women's studies*—Prerequisite: a bachelor's degree from an accredited college or university.

Required: the general requirements stated under Columbian School of Arts and Sciences, and 36 credit hours of course work, with or without a thesis. Policy-oriented students take WStu 221, 240, and either 220 or 225, plus four courses in the public policy area (PSc 203, 229, PPol 211, Econ 217) and 9 hours of electives. Those pursuing the Master of Arts in the field of women's studies must take WStu 220, 221, and 225, 12 credit hours in one other discipline (history, literature, economics, philosophy, religion, anthropology, or sociology), and 9 hours of electives. With permission, other disciplinary concentrations may be selected. All students take a final 6 hours chosen from WStu 283, 286, 366, or 183 and 295. All candidates are required to pass a Master's Comprehensive Examination.

Note: Prerequisite to all graduate-level women's studies courses: WStu 120 and 125 or equivalent, or permission of instructor.

220 **Fundamentals of Feminist Theory** (3) Palmer
Same as AmSt 220. The historical development of feminist theory in Europe and the United States from the 1790s to the 1940s, focusing on feminist uses of and responses to enlightenment liberalism, social Darwinism and other leading reality based social theories, Marxism, Freudianism, and existentialism. Theories are examined in the context of women's movements for social justice. (Fall)

221 **Research Issues in Women's Studies** (3) Deutch
Analysis of the contribution of feminist or gender-relations perspectives from humanities and social science disciplines to the issues and methods of social research and social policy and practice. Topics include a review of feminist frameworks, a critique and re-evaluation of traditional academic disciplines and analysis of current research on and for women. (Fall)

225 **Contemporary Feminist Theory** (3) Douglas
Developments in feminist theory in the past 20 years, with a primary focus on American feminism and some consideration of European and Third World thought. (Spring)

238 **Feminist Ethics and Policy Implications** (3) Wess
Same as Phil 238.

240 **Women and Public Policy** (3) Deitch, Harrison
Analysis of gender-related U.S. policy issues, such as domestic violence, military service, abortion rights, equal employment opportunity, child and dependent care, welfare, social security, and international development assistance. (Spring)

241 **Women and the Law** (3) Harrison
Legal status of women. Emphasis on marital status, employment, media, education, health services, crime, and the Constitution. (Fall)

251 **Women and Writing** (3) Staff
Same as Engl 251.

260 **Women and Work in the United States** (3) Staff
Theoretical approaches, from the perspectives of several disciplines, to explanations of the movement of women between paid employment in the labor force and unpaid employment outside the labor force since 1945. The persistence of job-related gender and racial discrimination and of income differentials by gender. Prerequisite: Econ 11–12 or 217 or permission of instructor. Same as Econ 141.

270 **Seminar: Selected Topics** (3) Staff
Investigation of a current policy issue of particular concern to women, or consideration of women's status in a particular social system. May be repeated for credit. (Fall and spring)

280 **Independent Study** (3) Staff
May be repeated for credit. Arrangements must be made with sponsoring faculty member prior to registration.

283 **Practicum in Women's Studies** (6) Deitch
Study of the changing status of women through supervised assignment to public and private agencies engaged in policymaking, education, political action, and research. Placement arrangements must be made the semester prior to registration; departmental permission is required. (Spring)

295 **Independent Research in Women's Studies** (arr.) Staff
Individual library or field research. Arrangements must be made with the sponsoring faculty member prior to registration; a written proposal is required.

299–300 **Thesis Research** (3–3) Staff

FACULTY AND STAFF OF INSTRUCTION 1997–1998
(as of Fall 1997)

Columbian School of Arts and Sciences

School of Business and Public Management

Graduate School of Education and Human Development

School of Engineering and Applied Science

Elliott School of International Affairs

EMERITI

Lewis Francis Affronti, *Professor Emeritus of Microbiology and Immunology*
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Galip Mehmet Arkilic, *Professor Emeritus of Engineering and Applied Science*
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Eng.Dr. 1957, University of Rome

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Robert Guy Brown, *Professor Emeritus of Sociology*
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B.S. 1948, Carnegie Institute of Technology; M.S. 1956, North Carolina State University; M.S. 1966, Ph.D. 1972, Stanford University

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Jeffrey C. Long, *Senior Investigator and Chief, Section on Population Genetics and Linkage, Laboratory of Neurogenetics, National Institute on Alcohol Abuse and Alcoholism*
Ph.D. 1984, University of Virginia

Ho-kwang Mao, *Geophysicist, Geophysical Laboratory, Carnegie Institution of Washington*
Ph.D. 1968, University of Rochester

Lynne R. Parenti, *Curator of Fishes, National Museum of Natural History, Smithsonian Institution*
Ph.D. 1980, City University of New York

William D. Phillips, *Physicist, National Institute of Standards and Technology*
B.S. 1970, Juniata College; Ph.D. 1976, Massachusetts Institute of Technology

Richard L. Proia, *Chief, Section on Biochemical Genetics, Genetics and Biochemistry Branch, National Institute of Diabetes and Digestive and Kidney Diseases*
Ph.D. 1980, University of Texas Southwestern Medical Center

Ayoub Rashtchian, *Manager of Research and Development, Nucleic Acid Amplification and Non-Radioactive Labeling, Life Technologies, Inc., Gaithersburg, Maryland*
Ph.D. 1981, University of Nebraska

Kerry Roberts-Manson, *Senior Medical Psychologist, National Rehabilitation Hospital, Bethesda, Maryland*
Ph.D. 1988, California School of Professional Psychology

Gregory M. Ruiz, *Estuarine Zoologist, Smithsonian Environmental Research Center*
Ph.D. 1987, University of California, Berkeley

Shoshana Segal, *Associate Research Professor of Medicine, Uniformed Services University of the Health Sciences*
Ph.D. 1973, Georgetown University

Johannes van de Geijn, *Head, Radiation Physics and Computer Section, Radiation Oncology Branch, National Cancer Institute*
Ph.D. 1956, University of Utrecht, Netherlands

Tom van der Zwet, *Senior Investigator, Appalachian Fruit Research Section, U.S. Department of Agriculture*
Ph.D. 1959, Louisiana State University

Gerardo Raul Vasta, *Associate Professor of Marine Biotechnology, University of Maryland*
Doctor 1978, Doctor 1980, National University, La Plata, Argentina

Jonathan Vogel, *Investigator, Dermatology Branch, National Cancer Institute*
M.D. 1981, Rush Medical College

Thomas Alexander Waldmann, *Chief, Metabolism Branch, National Cancer Institute*
M.D. 1955, Harvard University

Richard L. Warren, *Microbiologist, Department of Bacterial Diseases, Walter Reed Army Institute of Research*
Ph.D. 1974, University of Utah

Harvey James Whitfield, Jr., *Associate Professor of Psychiatry, University of Illinois at Chicago*
B.S. 1961, M.D. 1964, University of Illinois

RESEARCH CENTERS AND INSTITUTES

The University seeks to ensure the close integration of research and teaching, including the employment of students in sponsored projects and the use of research facilities for instructional purposes.

Biostatistics Center (*J. Lachin III*)
Burdetsky Labor Management Institute (*B. Burdetsky*)
Center for the Advancement of Small Business (*C. Toftoy*)
Center for Communitarian Policy Studies (*A. Etzioni*)
Center for Curriculum, Standards, and Technology (*M. Futrell*)
Center for Economic Research (*A. Yezer*)
Center for Equity and Excellence in Education (*C. Rivera*)
Center for Family Enterprise (*E. Winslow*)
Center for Gastroenterology and Nutrition (*H. Fromm*)
Center for Health Policy Research (*S. Rosenbaum*)
Center for History in the Media (*N. Seavey*)
Center for the History of Recent Science (*H. Judson*)
Center for Intelligent Systems Research (*A. Eskandarian*)
Center for International Health (*R. Rodriguez-Garcia*)
Center for International Science and Technology Policy (*J. Logsdon*)
Center for Law Practice Strategy and Management (*S. Chitwood*)
Center for Nuclear Studies (*H. Haberzettl*)
Center for Public and Financial Management (*C. Tierney*)
Center for Social and Organizational Learning (*S. Umpleby*)
Center for Structural Dynamics Research (*S. Sarkani*)
Center for the Study of Combustion and the Environment (*H. Miller, C. Mavriplis*)
Center for the Study of Language and Education (*J. Gomez*)
Center for the Study of Learning (*D. Schwandt*)
Center for Washington Area Studies (*J. Henig*)
Center to Improve Care of the Dying (*J. Lynn*)
Cyberspace Policy Institute (*L. Hoffman*)
Dean Dinwoodey Center for Intellectual Property Studies (*H. Wegner*)
Declassification Productivity Research Center (*R. Scotti*)
Environmental Law Advocacy Center (*J. Turley*)
Environmental Systems Engineering Center (*D. Jones*)
ERIC Clearinghouse on Higher Education (*J. Fife*)
Financial Markets Research Institute (*T. Barnhill*)
First Federal Congress Project (*C. Bickford*)
Institute for Advanced Studies in Immunology and Aging (*A. Goldstein*)
Institute for Applied Space Research (*H. Helgert, B. Edelson*)
Institute for Artificial Intelligence (*B. Silverman*)
Institute for Biomedical Sciences (*S. Ladisch*)
Institute for Brazilian Business and Public Management Issues (*F. Robles, J. Ferrer, [illegible]*)
Institute for Clinical Research and Clinical Trials (*J. Rios*)
Institute for Computer Graphics (*J. Hahn*)
Institute for Crisis, Disaster, and Risk Management (*J. Harrald*)
Institute for Education Policy Studies (*J. Gomez, I. Rotberg*)
Institute for the Environment (*L. Hourcle*)
Institute for European, Russian, and Eurasian Studies (*J. Millar*)
Institute for Global Management and Research (*H. Askari*)
Institute for Health Policy Outcomes and Human Values (*G. Pawlson*)
Institute for Magnetics Research (*E. Della Torre*)
Institute for Materials Science (*D. Ramaker, C. Gilmore*)
Institute for Medical Imaging and Image Analysis (*M. Loew, D. Goodenough*)
Institute for MEMS and VLSI Technologies (*M. Zaghloul*)
Institute for Reliability and Risk Analysis (*N. Singpurwalla*)
Institute for Urban Environmental Research (*D. McGrath*)

International Center for Project Management Excellence (*J. Frame*)
International Institute for Tourism Studies (*D. Hawkins*)
International Rule of Law Center (*M. Singer*)
Joint Institute for the Advancement of Flight Sciences (*T. Mazzuchi, J. Whitesides*)
Lipid Research Clinic (*J. Hsia*)
National Crash Analysis Center (*N. Bedewi, A. Eskandarian*)
National Health Policy Forum (*J. Jones*)
National Ports and Waterways Institute (*J. Harrald*)
Ronald Reagan Institute for Emergency Medicine (*R. Shesser*)
Sigur Center for Asian Studies (*D. Shambaugh*)
Space Policy Institute (*J. Logsdon*)
Transportation Research Institute (*N. Bedewi, A. Eskandarian*)
Wilson Genetic Counseling Center (*J. Larsen*)

DIVISION OF UNIVERSITY PROGRAMS

Introduction

The Division of University Programs administers the University's off-campus credit courses and degree programs. The Division also offers noncredit certificate programs, courses, and workshops through the Center for Career Education. The staff of instruction for Division programs includes members of the full-time faculty of the University and academically qualified adjunct faculty from the professional community selected by the academic departments and schools.

The Division works closely with education directors, public school officials, and personnel administrators in government, business, and industry to develop courses of study for continuing education students. The Division offers courses at the Crystal City Education Center in Arlington and the Alexandria Graduate Education Center, both in Virginia, and at other off-campus locations in the District of Columbia and suburban Maryland and Northern Virginia. The Division also offers, through its Hampton Roads Center, certificate and graduate degree programs in various disciplines at locations in the Hampton, Norfolk, and Virginia Beach area.

The academic standards of the University are maintained in off-campus credit courses. All off-campus programs offered and administered by this Division are approved through the procedure authorized by the Board of Trustees and the charter granted by the Congress of the United States. Degrees are granted through the faculties of the degree-granting schools and colleges of the University. Credit earned through off-campus study conforms to academic standards throughout the University. All Division off-campus offerings in Maryland are approved by the Maryland State Board for Higher Education; those in Virginia are approved by the Commonwealth of Virginia Council of Higher Education. Except as outlined below, all general University regulations apply to students in the Division of University Programs. In addition, Division students may be subject to special requirements of the school or college through which they are taking courses.

Admission as a Degree Candidate in Off-Campus Programs

Students wishing to be admitted as candidates in an off-campus degree program may obtain application forms from the school concerned, the Division of University Programs, one of the University's off-campus representatives, or the education officer of their agency or installation.

Nondegree Students

Off-campus credit courses may be taken by nondegree students who meet the prerequisites prescribed by the department concerned. Formal University ad mission is not required at the time of initial registration in off-campus courses. Those students who plan eventual degree candidacy should note that each school places a specific limit on the number of credit hours taken in nondegree status that can be applied toward a degree.

Degree Programs

The following degree programs are offered through the Division of University Programs.

Columbian School of Arts and Sciences—For program information, see the field concerned under Courses of Instruction.

Master of Arts in the fields of administrative sciences (human resources management and organizational management), criminal justice (crime in commerce and security management), legislative affairs, telecommunication

School of Business and Public Management—For program information, see the section on the School of Business and Public Management.

Master of Business Administration

Master of Science in Information Systems Technology with a major field in management information systems

Master of Tourism Administration

School of Engineering and Applied Science—For program information, see the section on the School of Engineering and Applied Science.

Master of Engineering Management

Master of Science with major fields in civil and environmental engineering, computer science, electrical engineering, engineering management, operations research, telecommunications and computers

Professional Degrees (*Engineer* and *Applied Scientist*)

Graduate School of Education and Human Development—For program information, see the section on the Graduate School of Education and Human Development.

Master of Arts in Education and Human Development in the fields of curriculum and instruction, educational technology leadership, elementary, secondary administration and supervision, higher education administration, human resource development, and school counseling

Master of Education in the field of secondary education

Education Specialist in the fields of educational administration and human resource development

Center for Career Education

The Center for Career Education (CCE) provides a broad spectrum of services focusing on innovative, nontraditional, career-oriented education. Among CCE programs are noncredit, graduate-level career certificate programs to prepare college graduates to become legal assistants, publication specialists, landscape designers, administrative managers, association executives, information systems specialists, multimedia product designers, and appraisers of fine and decorative art. Workshops, short-term courses, and intensive summer programs provide the opportunity for individuals to be informed of innovation in their fields.

Office of University Students

The Office of University Students (OUS) makes on-campus credit courses available to those who are not currently degree candidates at this University. Such students, often employed in government or industry, may be taking courses to

enhance their career potential or as a matter of personal interest. They may be candidates for higher degrees at other institutions, sent here for special work as part of a graduate program. They may be undergraduates matriculated elsewhere, taking courses for transfer to their own institution.

All courses except those restricted to medical and law students are open to OUS students, provided there is room in the class and the student has sufficient preparation as determined by the academic departments.

Registration in a given course may be denied OUS students when space is needed for degree candidates. OUS students are not eligible to register for thesis or dissertation research nor for continuous enrollment or leave of absence. OUS requires a minimum registration of 3 credit hours per semester or session, except in special circumstances as approved by the dean.

Entrance Requirements

An academic background appropriate for the program of studies contemplated is required. In addition, the applicant who has previously attended this or another college or university must be in good standing at that institution. An applicant who has been suspended from any educational institution for poor scholarship will not be considered for admission for one calendar year after the effective date of the suspension.

Applications for admission through OUS are necessary for international students; applications should be obtained from and returned to the Office of Admissions. There is no application fee. For information on registration, please refer to the *Schedule of Classes*.

Regulations

See Fees and Financial Regulations: University Regulations. Prospective and registered students are urged to acquaint themselves with the regulations governing attendance and withdrawal stated under University Regulations. The following specifically apply to all students registered through OUS:

Last day to add a class for credit—end of second week of classes.

Last day to drop a class for credit or to withdraw from the University—end of the seventh week of classes.

Equivalent amounts of time apply to the summer sessions.

Academic Work Load

For OUS students, the normal academic work load during the regular academic year is not more than 10 credit hours for a student employed more than 20 hours per week and not more than 18 credit hours for a full-time student. During the summer a student may take a maximum of two courses during any one session. Exceptions to these limits must be approved by the director.

Scholarship Requirements

A student who fails to maintain the scholarship requirements of OUS may be dismissed from the University. A statement of scholarship requirements is available in the office of the director. All grades received in OUS remain on the record; scholarship requirements are based on the total record.

Grades—See University Regulations. There is no limitation on the number of courses that may be taken on a pass/no pass basis in OUS; however, there may be a limit on the number that can be transferred to fulfill degree requirements.

Incomplete/Authorized Withdrawal

Conditions under which the grades of *I* (Incomplete) and *W* (Authorized Withdrawal) may be assigned are described under University Regulations.

Changing an Incomplete—The instructor normally sets a period (maximum of one year) within which the uncompleted work must be made up. An Incomplete that is not changed within one calendar year remains as a grade of *I* on the student's record.

Change in Program of Studies

Change Within the Office of University Students—A student may not change status to that of auditor except with the approval of the dean (see Withdrawal under University Regulations).

Transfer Within the University—Transfer to or from OUS may be made only with the approval of the deans concerned. Application for transfer to degree candidacy will be considered only after the completion of at least one semester in OUS or upon request from the college or school to which the student is seeking admission. Students wishing to transfer to degree candidacy must meet the conditions of the college or school to which they are applying. It is the responsibility of the student to consult the college or school concerning conditions to be met and the amount of work transferable.

SUMMER SESSIONS

Through the Office of Summer, Special, and International Programs, courses are offered during the summer by all degree-granting divisions of the University. During the summer the University also offers special programs that are not available during the regular academic year. Courses are offered during both day and evening hours. Students who are enrolled at the University for the spring semester may register for the following Summer Sessions without special application. Those who wish degree status may seek admission from the appropriate school within the University. Those who do not wish to work toward a degree at the University may apply through the "Quick Entry" process described in the Summer Sessions Announcement. For a complete statement concerning summer term work, see the Summer Sessions Announcement.

STUDENT SERVICES

Office of the Dean of Students

The Office of the Dean of Students provides counseling and information for students, administers the nonacademic student disciplinary system and student grievance procedures, administers medical withdrawals, and assists in nonacademic program development. Staff members are well informed on University policies and the various student services provided on campus, enabling them to provide referrals and answers to many questions concerning general student life. Personal letters of recommendation for students applying to graduate and professional schools can be obtained from this office.

Housing

Although the University does not provide residence hall space for graduate students, the Community Living and Learning Center refers graduate students to apartments as they become available in University-owned buildings in the campus area. With a Metro stop on-campus, GW is easily accessible via public transportation. An off-campus housing resource center can be reached at www.och.gwu for listings, a mover's guide, neighborhood information, and on-line help.

Student Health Service

The Student Health Service is an outpatient clinic staffed by physicians, nurse practitioners, and physician assistants who can evaluate and treat most of students' medical problems. Visits should be arranged by appointment; urgent problems may be seen on a walk-in basis if necessary. Charges may be incurred for labwork, immunizations, allergy injections, supplies, and medication. Psychiatric evaluation and short-term therapy appointments and crisis intervention are available. Health education and outreach programs on a variety of topics are provided throughout the year.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. All fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and continuing education programs are not eligible. The bills incurred from all services rendered outside of the Student Health Service (for example, X-ray work, laboratory work, and office visits to private physicians) are the responsibility of the student.

Health and Accident Insurance

The University recommends that all students be covered by health and accident insurance. For information on group health insurance options offered through the University, students should contact the Student Health Service or Office of the Dean of Students.

University Counseling Center

The University Counseling Center was established to help students resolve personal, social, career, and study problems that can interfere with their academic success. Services include workshops and groups on topics that include time management, study skills, procrastination prevention, family and interpersonal issues, stress management, conflict management, and self-esteem; clinical services including crisis intervention, brief personal counseling, and referral assistance, and consultation and training programs for student, faculty, and staff groups. Career counseling and referral services are available to GW students, faculty, staff, alumni, and individuals from the greater Washington community.

The Speech and Hearing Center

The Speech and Hearing Center provides diagnosis and treatment of a wide range of speech, language, and hearing disorders. These include developmental impairments of articulation and language, stuttering, voice disorders, and speech and language impairments resulting from neurological damage. Services are available for persons wishing to modify a regional dialect or foreign accent. Education and aural rehabilitation are also provided for hearing-impaired individuals. The Speech and Hearing Center operates in conjunction with the Department of Speech and Hearing.

The Writing Center

In conjunction with the Department of English, the Writing Center provides writing instruction to GW students at all levels of experience and expertise. Students are assisted in identifying writing problems and learning how best to express ideas. Trained tutors (undergraduate peer tutors, graduate students, and the director and other members of the faculty) work with students individually on areas of specific need or interest. Tutors provide assistance in such areas as organizing a mass of information efficiently and clearly, using correct grammar and punctuation, getting started on a writing project, developing a thesis, providing evidence in support of an argument, and presenting the findings of an experiment or the solution to a research problem.

Computer Information and Resource Center

The Computer Information Resource Center (CIRC) provides computer facilities, technical assistance, and information on the use of computers and computer networks. CIRC supports IBM–PC, Apple Macintosh, and Unix. The CIRC computer laboratories are open seven days a week, 24 hours a day. CIRC also maintains computer classrooms on campus; students generally have access to these rooms when classes are not in session. The George Washington Information System provides information about the campus plus research and information resources from around the globe on the Internet.

In cooperation with the Gelman Library and GW Television, CIRC publishes a periodic newsletter on computing issues. CIRC gives seminars and offers technical advice to faculty and students regarding use of Windows and Macintosh personal computers, Unix computers, and HTML. Students and faculty may receive assistance from GW's nonprofit computer store for microcomputer selection and acquisition.

Any University student may have access to the computer facilities for individual research, class projects, and thesis or dissertation study.

Career Center

The Career Center promotes effective career planning, teaches job search strategies, and facilitates contacts between GW students, alumni, and prospective employers through its many services. Services include full- and part-time job listings; internship listings; career consulting; workshops (including Job Search Strategies, Letters and Resumes, Effective Interviewing); a career resource library; campus interviewing; a resume referral service; resume critiques; cooperative education; student employment; RESUMIX services; computer- and Internet-based job resources; and a credentials service that supports graduate professional school applications.

International Services Office

The International Services Office provides services to GW's international students, scholars, faculty, and staff. The office provides advising on a variety of personal issues, including cultural adjustment, living conditions, academic concerns, and finances; provides immigration assistance and information on U.S. government requirements and regulations specific to the international community; conducts orientation programs to assist in living, studying, and working in the United States; and serves as a resource center for the University community on issues of cross-cultural understanding.

Disability Support Services

The Disability Support Services Office works to assure that the special services necessary for disabled students to participate fully in their academic programs

and the extracurricular life of the campus are provided for them through University or community resources.

Student Activities Center

The Student Activities Center furthers the educational mission of the University by offering programs, services, and facilities that foster the social and cultural development and school spirit of members of the University community. Staff members assist individual students and campus organizations with event planning, program coordination, and participation in special projects.

Programs and activities include advisement of campus organizations, registration of student organizations, planning and coordination of major campus events, and oversight of Greek Affairs, Colonial Inauguration, the Presidential Administrative Fellows Program, band and cheerleading, and intramural and club sports. Additional information about the services offered by the Student Activities Center, and about the various student organizations and committees, can be obtained from the *Student Planner and Handbook*.

Program Board—The Program Board, composed chiefly of elected and appointed students, has the primary responsibility of allocating resources for student programming on campus. In addition, the Program Board provides funding for activities presented by various campus organizations and encourages student participation in program planning through involvement in committees on the arts, concerts, festivals, films, parties, political affairs, and public relations.

Student Government—The George Washington University Student Association is made up of all full-time and part-time undergraduate and graduate students who are registered for academic credit on campus. A body of elected and appointed individuals is responsible for representing the interests of students at the University. The Student Association provides various services for students, such as academic evaluations, test and syllabus files, and the Student Advocate Service.

Student involvement in the governance of the University is also possible through participation in various administrative and Faculty Senate committees, advisory councils of the schools and college, selected committees of the Board of Trustees, and specialized bodies, such as the Residence Hall Association, the Joint Food Services Board, and the Marvin Center Governing Board. This involvement has helped develop policies and programs beneficial to students and to the University community as a whole.

Student Organizations—Students are encouraged to become involved with existing student organizations or to initiate their own. There are approximately 270 registered organizations on campus, covering a broad spectrum of interests, including academic, professional, international, cultural, political, service, sports, hobbies, recreational, religious, and meditative groups as well as social fraternities and sororities.

The Cloyd Heck Marvin Center

The Marvin Center is the GW campus community center. The Marvin Center offers programs, services, and facilities for students, faculty, staff, alumni, and University guests. The Center's wide range of facilities includes dining locations, a theatre, lounges, recreational facilities, study rooms, conference and meeting rooms, Information Center, Colonnade Gallery, travel agency, computer store, bookstore, and Student Organization Resource Center. The Marvin Center also provides facilities for programs conducted by the University Program Board, academic departments that include the performing arts, and by other University organizations.

The Marvin Center Governing Board, which oversees the Center's policies, is a representative body composed of students, faculty, staff, and alumni. The

Board works closely with the Center's staff in the review and development of policies, guidelines, and procedures that direct the operation of the Center.

Religious Life

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the religious organizations of their own choice. Several religious bodies sponsor various groups and form a link between the University and the religious community. The advisors of the religious organizations are available for counseling and together constitute the Board of Chaplains to enhance religious life on campus. Religious services and special observances are also provided for the University community as announced.

Major Program Events

Art Exhibits—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Auditorium and in the Colonnade art gallery of the Marvin Center. Student art exhibits are presented each semester.

Concert Series—The Department of Music presents a series of concerts featuring faculty, guest, and student artists throughout each year. Other concerts are held regularly on campus.

Dance—The GW Dance Company presents major concerts, informal studio performances, experimental events, television appearances, and lecture-demonstrations. Students may audition to become company members and have the opportunity to choreograph, perform, and gain experience in the technical aspects of dance productions.

Glee Club, Jazz Band, and Orchestra—The University Glee Club, Jazz Band, and Orchestra are available to students as credit courses or as cocurricular activities; major performances are presented to the University community several times a year, including regular winter and spring concerts.

International Programs—The International Student Society presents an annual international dinner in cooperation with foreign embassies and international restaurants. Other programs include regular forums and speakers on international topics.

Program Board—The University Program Board, through its various committees and in cooperation with other campus groups, regularly sponsors films, lectures, concerts, social activities, and special events.

Theatre—The University Theatre produces four or five major plays and musicals during the year on the proscenium/thrust stage in the Dorothy Betts Marvin Theatre. Additional works, including original and experimental plays, are produced in a more intimate studio theatre. Students can participate in all aspects of theatre and may receive credit toward their B.A. or M.F.A. degrees for some of their production work.

Athletics, Recreation, and Intramurals

The Charles E. Smith Center offers many facilities for student use, including courts for basketball, volleyball, and badminton, a jogging track, a swimming pool, gymnastics and weight rooms, racquetball and squash courts, and a sauna and lockers. In addition, the Student Activities Center sponsors a broad program of intramural and recreational activities held in the Smith Center and designed to accommodate various levels of skill, experience, and interest.

The University is a member of the National Collegiate Athletic Association (NCAA), the Eastern College Athletic Conference (ECAC), and the Atlantic 10 Conference. Its intercollegiate varsity teams compete against major universities throughout the region and nation in such sports as basketball, baseball, soccer, tennis, golf, cross-country, crew, swimming and diving, water polo, volleyball, and gymnastics.

FINANCIAL AID

George Washington University offers a program of financial support for graduate students, which includes assistantships, fellowships, traineeships, graduate scholarships, research appointments, part-time employment, and loans. Loans and resident assistantships not based on financial need are available. In general, consideration for financial aid is restricted to students in good academic standing who meet the minimum grade-point average for particular awards and are not financially encumbered by any other University office.

The University reserves the right to ask for documentation necessary to determine aid eligibility. Documents submitted as part of aid applications become the property of the University and cannot be returned. Federal regulations require that the University report suspected cases of fraud or misrepresentation to the appropriate federal, state, and local authorities.

Gift aid (scholarships, grants, fellowships, assistantships, tuition awards, etc.) is taxable to the extent that it exceeds the allowable costs of tuition, fees, and required books and supplies or is dedicated to other costs, such as room and board. Federal grants may be taxable if, together with other gift assistance, they exceed the allowable costs.

Application and correspondence concerning assistantships, fellowships, traineeships, or graduate scholarships should be sent directly to the dean of the school concerned and addressed to George Washington University, Washington, D.C. 20052. Unless otherwise specified, application and supporting credentials should be submitted no later than February 1 preceding the academic year for which the award is made. Application for admission to graduate study is a prerequisite for consideration.

Information in this section is accurate at the time this Bulletin is prepared for press. Future changes in federal regulations or institutional policies may alter the application requirements or program guidelines.

Office of Fellowships and Graduate Student Support

The Office of Fellowships and Graduate Student Support provides information on awards that may be used in support of graduate study. These awards are generally sponsored by foundations, professional and learned societies, industries, and other organizations. Assistance is also offered to those wishing to apply for such prestigious fellowships as the Rhodes, Marshall, National Science Foundation, Fulbright, and Luce.

These services are provided to entering and enrolled graduate students, to enrolled undergraduates planning for graduate study, and to alumni. For students planning to enter a GW graduate program, a self-search graduate fellowship information section is maintained on the first floor of Gelman Library.

Assistantships

Research Assistantships—May be available in departments with faculty who are participating in sponsored research.

Research Scholar Assistantships—School of Engineering and Applied Science, GW/NASA–Langley Joint Institute for the Advancement of Flight Sciences, and Program for Research and Education in Space Technology, GW/NASA–Goddard Space Flight Center.

Graduate Teaching Assistantships—Available to graduate students in master's and doctoral programs in most departments of the University. A graduate teaching assistant receives financial compensation for a designated unit of service. The assistant's major department of instruction. All new graduate teaching assistants must attend an orientation and evaluation program.

Resident Assistantships—Available to graduate students in any field of study who are interested in working in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes salary and a furnished room for the academic year. All positions are part time, and staff members are required to enroll as full-time students in degree programs. Further information may be obtained from the Community Living and Learning Center.

Fellowships, Scholarships, and Related Programs

University Fellowships—Available to graduate students in master's and doctoral programs in most departments of the University. Fellowships are based on scholarship and each fellow may receive a stipend and/or tuition allowance.

Research Traineeships—Available under numerous sponsored programs in a number of departments. Stipends vary; information is available from the departments.

Other Fellowships, Scholarships, and Related Programs

Achievement Rewards for College Scientists Scholarship
American Association of Collegiate Schools of Business Fellowship
American Civilization Fellowships
American Civilization Internships (Smithsonian Institution–George Washington University Cooperative Program)
American Iron and Steel Institute Fellowship
American Red Cross Fellowships
Angeline Anderson Scholarship Fund
Arthur Anderson & Co. Doctoral Fellowship
Armed Forces Health Professions Scholarship Program
Aryamehr Research Fellowships
Atlantic Research Corporation Scholarship
Benjamin Banneker Fellowship for Washington Area Studies
Robert R. Banville Scholarship Fund
Bell Atlantic Graduate Fellowship
Bender Scholarship to the University of Cambridge
Florence Bichan/Scottish Rite Scholarship
Mary Darnell Blaney Fellowship in International Relations
Winfield Scott Blaney Fellowship in International Relations
Gail E. Boggs Engineering Scholarship
John and Claudia Boswell Scholarship Fund
Letitia Woods Brown Fellowship in African American History
Brown Scholarship Fund
Business Administration Departmental Fellowships
Career Development Scholarships
Oliver T. Carr, Jr., Scholarship
Oliver T. Carr, Sr., Memorial Fellowship
Center for Washington Area Studies Fellowship
James Edward Miller Chapman Educational Foundation Scholarship
Daewoo Corporation Scholarships
Maria Davis European Studies Fellowship
Vincent J. DeAngelis Scholarship Fund
District of Columbia Institute of Certified Public Accountants Scholarship in Accounting
Dockery Endowment Scholarship
Eaves-Carden Graduate Scholarship
Thomas Alva Edison Fellowship
Elementary Teacher Education Internships
Ernst & Ernst Grant to Doctoral Candidates in Business or Economics
Ernst & Young Grant to Doctoral Candidates in Accountancy
King Fahd Fund

James Harold Fox Scholarship Fund
Mary Hatwood Futrell Scholarship Fund
Louis E. Giles Memorial Scholarships
Global Leaders Fellowships
Leo and Lillian Goodwin Endowment Scholarship
Government Intern Scholarship
Graduate Engineering Honors Fellowship Program
Green Scholarship Fund
Gruss Scholarship Fund
GW Fellowship for Ph.D. Studies in Government and Business
Hampel Scholarship
Bryce Harlow Foundation Scholarship
Elizabeth Earle Heckmann Graduate Scholarship
Norris E. Hekimian Graduate Award
Adele Melbourne Holmes Native American Scholarship
Thelma Hunt Graduate Fellowship in Psychology
Hyundai Scholarship Fund
Richard D. Irwin Doctoral Fellowships
Albert A. and Esther C. Jones Scholarship Fund
Allen M. Jones Scholarship Fund
Marvin L. Kay Fellowship in Finance
Rita H. Keller Scholarship Fund
Kendrick Graduate Fellowship
Isabella Osborn King Research Fellowships
Wolfgang and Astrid Kraus Graduate Scholarships
Leola D. Lasker Fellowships in Housing, City Planning, or Urban Renewal
Lerman Endowment Fellowships
Myron L. Loe Graduate Student Scholarship
Mary and Daniel Loughran Graduate Scholarship
Morris Louis Fellowship in Painting
Mathen Graduate Fellowship
J. Willard Marriott Foundation Graduate Scholarships
George McCandlish Fellowship in American Literature
Mellon Foundation Fellowships
Richard E. Merwin Memorial Award
National Association of Purchasing Management Fellowship
National Geographic Society Fellowships
National Historical Publications Commission–George Washington University Cooperative Research Fellowships
National Science Foundation Graduate Fellowships
Paul Pearson Scholarship Fund
Phi Delta Gamma Scholarship Fund
Planning and Related Professions Program
Presidential Scholarships
Presidential Merit Fellowships
Public Administration Faculty–Alumni Scholarship
Public Policy Studies Fellowships
Resources for the Future, Inc., Fellowship Prize
Rockefeller Biography Internships
Thomas Bradford Sanders Fellowship
School of Engineering and Applied Science Graduate Fellowship
Scottish Rite Graduate Endowment Fellowships
Second Master Fellowship
Shirley M. and Maurice C. Shapiro Scholarships to the University of Oxford
Shirley M. and Maurice C. Shapiro Traveling Fellowship
Shirley M. and Maurice C. Shapiro Fellowships in International Affairs
Richard Shott Scholarship Fund

U.S. Office of Education Fellowships
U.S. Public Health Service Traineeships
Urban Studies Fellowships, Department of Housing and Urban Development
Urban Transportation Center Fellowship
Voorhees Scholarships
Washington Gas and Light Scholarship
Ronald Barbour Weintraub Research Fellowship in Biological Sciences
Wolcott Foundation Scholarships
Helen and Sergius Yakobson Graduate Scholarship

Loan Funds

Federal Stafford Loans—George Washington University is an eligible participant in the Federal Stafford Loan Program. These loans are made by lenders including banks, credit unions, and savings and loan associations. Graduate students enrolled at least half time may apply for Subsidized Stafford Loan funds up to $8,500 per year, based on their need as determined by a federally mandated formula based on the Free Application for Federal Student Aid (FAFSA). Stafford loans are variable-interest-rate loans, currently capped at 8.25%, with a repayment period up to 10 years; the government pays the interest while students are enrolled in school at least half time and for six months afterward. All graduate students may apply for an Unsubsidized Stafford Loan up to $18,500 less any subsidized amount received. Terms and conditions are the same, except that the student borrower is responsible for all interest that accrues on the unsubsidized amount during the in-school period; deferments are available. Graduate students must apply for, and be eligible for, a full Subsidized Stafford Loan before their eligibility for a Federal Perkins Loan or Federal Work–Study will be determined.

Students must file the FAFSA and designate GW to receive their information. In addition, students must submit the Loan Questionnaire for the current year and a completed Stafford Loan application. Tax information for the current tax year (for example, 1997 for the 1998–1999 academic year) is required only for those selected for federal verification and for those who submit a Special Condition Form. Students who intend to use loan proceeds for payment of University charges at the time of registration should submit a loan application and all supporting documents to the Office of Student Financial Assistance by June 1 for the fall semester, October 1 for the spring semester, and March 1 for the summer sessions.

Note that federal statute requires multiple disbursements of Stafford loans. Recipients of one-semester-only federal loans should be aware that the second disbursement of loan proceeds occurs halfway through the semester. Students may not borrow against or take out an emergency loan on their next semester's loan disbursement until the first day of classes of that term.

Students with one-semester loans should consider whether the Stafford Loan is appropriate to their needs. In some cases it will be to the student's advantage to utilize an alternative loan that can be delivered in a single disbursement at the start of the semester. Emergency loans are limited to one loan per term.

Other Loan Funds—The following loan funds are available to degree students. Complete information regarding each loan fund is available from the Office of Student Financial Assistance, Fiscal Section, The George Washington University, Washington, D.C. 20052.

American Medical Association Nursing Home Administration Loan Fund
George F. Henigan Loan Fund
International Student Loan Fund
Joanne Jacobs Student Loan Fund
W. K. Kellogg Foundation Hospital Administration Loan Fund

Jessie B. Martin Loan Fund
Jack and Anne Morton Loan Fund
Barney Plotnick, Student Loan Fund
Hiram Miller Stout Memorial Loan Fund
University Student Emergency Loan Fund
Edmund W. Dreyfuss Loan Fund
Peter and Doris Firsht Loan Fund

In addition, the Inner-City Special Student Assistance Loan Fund is available through the GW Multicultural Student Services Center.

Further information regarding need-based aid is available through the GW Office of Student Financial Assistance.

Student Employment

The University participates in the Federal College Work–Study Program. Inquiries should be addressed to the Office of Student Financial Assistance. In addition, the Career Center maintains a registry of both full-time and part-time positions available in the Washington area for undergraduate and graduate students. After registration, students may apply at the Center for interviews and referrals to positions for which they are qualified.

International Students

Limited awards for graduate teaching assistantships and University fellowships are the responsibility of the chairman of the department or dean of the school in which the degree is to be earned.

International students applying for graduate teaching assistantships must have minimum scores of 570 on the Test of English as a Foreign Language (55 in listening comprehension) and 250 on the Test of Spoken English. International students applying from outside the University may be appointed to graduate teaching assistantships but must successfully complete an orientation and evaluation program held prior to registration. Those found to have difficulties with English will be required to enroll in specified courses in English as a Foreign Language and will be assigned nonteaching duties in place of classroom instruction. Such students will be reevaluated each semester: if they are not designated as qualified to give classroom instruction by the end of one academic year, the teaching assistantship will not be renewed.

Graduate students who are presently enrolled at GW and have been proposed as candidates for graduate teaching assistantships by their departments must pass the Test of English as a Foreign Language at the levels indicated above and may be required to complete successfully the English for International Students oral interview and the orientation and evaluation program before they will be considered for graduate teaching assistantships.

For further information on requirements for international teaching assistants, contact the director of the University Teaching Center.

Long-term loan funds for undergraduate and graduate international students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have sufficient funds available to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September–May) was $22,781 in 1997–1998 and will be higher in 1998–1999; generally speaking, expenses for international students are about $2,000 over the stated figure, which includes room and board, tuition, books, clothes, and incidental expenses, but not travel, holiday, or medical expenses.

UNIVERSITY REGULATIONS

Students enrolled in the University are required to conform to the following regulations and to comply with the rules and regulations of the school or division in which they are registered. Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reenter and continue work only under the regulations and requirements in force at the time of return.

If a student knowingly makes a false statement or conceals material information on an application for admission or any other University document, the student's registration may be canceled. If such falsification is discovered after the student has matriculated at the University, the student may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the faculty) for subsequent registration in the University.

Registration

Information on registration procedures is stated in the *Schedule of Classes*, which is available in advance of each semester.

Registration in courses is open only to those persons formally admitted to the University by the appropriate admitting office, as well as those students in good standing who are continuing in an approved program of study.

No registration is accepted for less than a semester or one summer session.

Students may not register concurrently in this University and another institution without the prior permission of the dean of the school in which they are registered in this University. With the exception of students enrolled in joint degree programs, registration in more than one school of the University requires the written permission of the deans concerned, prior to registration. Registration is not complete until all financial obligations have been met.

Eligibility for Registration

Registration for the following categories of campus students is held on the days of registration published in the *Schedule of Classes*. A student who is suspended or whose record is not clear for any reason is not eligible to register. Registration in a given course may be denied students in the Division of University Programs when space is needed for degree candidates.

New Student—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration.

Readmitted Student—A student previously registered in the University who was not registered during the preceding semester must apply for and be granted readmission by the appropriate admitting office before being eligible for registration.

Continuing Student—A student registered on campus in the immediately preceding semester or the summer session preceding the fall semester is eligible to register assuming good standing and enrollment in a continuing program.

Completion of Registration

Registration is not complete until financial obligations have been fulfilled. Students who do not complete their financial obligations in a timely manner may be deregistered and will not be permitted to attend class.

Registration for Consortium Courses

Degree students interested in taking courses at any of the other institutions in the Consortium of Universities of the Washington Metropolitan Area, Inc., should consult the program announcements of the other institutions. Consortium registration forms and instructions may be picked up in the Office of the

Registrar. In order to participate in the Consortium program, students must obtain the approval of an advisor and should ascertain from the department of the institution where the course is taught whether they are eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar. Detailed information concerning Consortium policy and procedures is printed in the *Schedule of Classes*.

Student Status

For the purpose of defining student status, graduate students taking 9 or more credit hours are considered to be full time, those taking 5 to 8 hours are considered to be half time, and all others are considered to be part time.

Attendance

Students may attend only those classes for which they are officially registered. Regular attendance is expected. Students may be dropped from any course for undue absence.

Scholarship Requirements

Students who fail to maintain the scholarship requirements of the school or division in which they are registered may be dismissed from the University.

Grades

Grades are mailed to students through the Office of the Registrar at the close of each semester. The following grading system is used: *A*, Excellent; *B*, Good; *C*, Minimum Pass; *CR*, Credit; *F*, Fail; *I*, Incomplete; *IPG*, In Progress; *W*, Authorized Withdrawal; *Z*, Unauthorized Withdrawal. Other grades that may be assigned are *A*−, *B*+, *B*−, *C*+, and *C*−. Except for courses that specifically state that repetition for credit is permitted, a candidate for a degree at this University may not repeat a course in which a grade of *C* or above was received, unless required to do so by the department concerned. A written statement to this effect must be submitted to the student's dean by the appropriate department chair.

Incomplete/Authorized Withdrawal

When another grade has not been assigned, the symbol *I* (Incomplete), the symbol *W* (Authorized Withdrawal), or the symbol *Z* (Unauthorized Withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given the instructor for the student's inability to complete the required work of the course. At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond the student's control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, that instructor may initiate an appropriate grade change. The grade of *Z* is assigned when students are registered for a course that they have not attended and in which they have done no substantial graded work.

Changing a Grade of Incomplete

When work for the course is completed and a grade change turned in to the Office of the Registrar, the grade earned will be indicated in the form of *I*, followed by the grade. The indication of *I* cannot be removed from the transcript.

For more information concerning changing a grade of Incomplete, consult the regulations of the school or division concerned.

The Grade-Point Average

Scholarship is computed in terms of the grade-point average, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on his or her record in this University. The grade-point average is computed as follows: *A*, 4.0; *A*−, 3.7; *B*+, 3.3; *B*, 3.0; *B*−, 2.7; *C*+, 2.3; *C*, 2.0; *C*−, 1.7; *F*, 0, for each credit hour for which the student has registered in a degree program. Although credit value for a course in which a grade of *F* is earned appears on the transcript for the purpose of calculating the grade-point average, no academic credit is awarded. Courses marked *CR, I, IP, P, NP, W,* or *Z* are not considered in determining the average, except that courses marked *I* will be considered when a final grade is recorded. With the exception of Consortium courses, grades in courses taken at other institutions are not considered in computing the grade-point average.

Final Examinations

Final examinations for graduate-level courses are scheduled, if desired, by the individual department or instructor.

Use of Correct English

A report regarding any student whose written or spoken English in any course is unsatisfactory may be sent by the instructor to the dean of the school who may assign supplementary work, without academic credit, varying with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the dean.

Academic Integrity

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Incumbent students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels.

Copies of the University Code of Academic Integrity can be obtained from the following officers: all department chairs, all academic deans, the Registrar, and the Vice President for Academic Affairs.

Student Conduct

All students, upon enrolling and while attending The George Washington University, are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained from the Office of the Dean of Students or from the offices of the academic deans. Sanctions for violation of these regulations may

include permanent expulsion from the University, which may make enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

Withdrawal

Withdrawal from a course or from the University requires the permission of the dean of the school or division in which the student is registered. A grade of *W* will be recorded on the student's academic record. Permission to withdraw from the University will not be granted a student who does not have a clear financial record (see Payment of Fees). Each school and division of the University sets deadline dates for each semester concerning withdrawal.

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations. Unauthorized withdrawal will result in the recording of a grade of *Z* for the course or courses.

Changes in Program of Study

Changes Within a School or Division—A student may not substitute one course for another, drop courses (see Withdrawal, above), or change status from credit to audit or from audit to credit without the approval of the dean of the school or division in which he or she is registered. Change from one major field to another within the same school may be made with the approval of the dean.

Transfer Within the University—Application for transfer to another school or division must be made to the appropriate admitting office on the form provided by the office concerned.

Credit

Credit is given only after completion of registration in a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the school or division concerned.

Auditing

A person who has been admitted to the University may be registered, with the permission of the instructor, as an auditor in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. Tuition is charged at the prevailing rate.

Post-Admission Transfer Credit

Students who plan to attend another institution and apply credit so earned toward graduation from this University must first secure the written approval of their dean. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

Transcripts of Record

Official transcripts of student records are issued on written request of the student or former student who has paid all charges, including any student loan installments, due the University at the time of the request. A nominal fee is charged for each official transcript. Unofficial copies of transcripts are mailed to students, by written request, at a nominal fee. Partial transcripts are not issued.

Continuous Enrollment Status

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. A student is considered to be continuously enrolled when registered for courses or when engaged in and appropriately registered for activities such as the following, as specified by the regulations established by each school: cooperative work semester; study abroad program; attendance at another institution with prior approval to have work transferred back to the GW program; completion of outstanding work in courses in which a grade of Incomplete or In Progress was received (at the undergraduate level); or non-course instructional activities unique to the particular school. This status is generally limited to one year. Should the student break continuous enrollment at the University and not request and be granted a leave of absence (see below), he or she must apply for readmission and, if granted, be subject to the requirements and regulations then in force.

Leave of Absence

Should a degree student find it necessary to interrupt active pursuit of the degree, he or she may petition the dean for a leave of absence for a specific period of time, generally limited to one calendar year. A degree student who discontinues active enrollment in degree studies without being granted a leave of absence, or a student granted a leave who does not return to active study at the close of the period of approved absence, must apply for readmission and be subject to the regulations and requirements then in force. The right to use of University facilities is suspended while the leave is in effect.

Name of Record

A student's name of record includes the first name, middle initial or full middle name, and the family name. Nicknames may not be used. The University will change the name of a currently enrolled student on its official records but will require satisfactory evidence of a legal basis for the change. The diploma is awarded under the official name of record at the time of graduation.

Graduation Requirements

Degrees are conferred in January, May, and September. To be recommended by the faculty for graduation a student must have met the admission requirements of the school in which registered; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which registered; filed an application for graduation prior to the published deadline date; and be free from all indebtedness to the University. Enrollment is required for the semester or summer session at the close of which the degree is to be conferred, and all degree requirements must be completed by the last day of final examinations for that semester or summer session.

Participation in the Commencement Ceremony—Participation in the annual commencement ceremony held in May is open to students who have applied to graduate in the current spring semester or who graduated the preceding fall semester or summer session. With the exception of doctoral candidates, students who are within 6 hours of completing their degree requirements and who will complete all requirements during the summer session have the option of participating in either the preceding or the following May ceremony. Summer graduates who elect to attend the preceding May ceremony must apply for graduation no later than February 1. Students who apply after the published deadlines are not guaranteed commencement materials and may not be listed in the commencement program.

Scholarship and Residence—Students must meet the scholarship and residence requirements for the degree for which they are registered.

Curriculum—Minimum curriculum requirements for each degree are stated under the school offering work in preparation for the degree. In cases where specific curricular information is not provided in this Bulletin, the program of study, as indicated by the program faculty, must be completed.

Thesis or Dissertation—A thesis or dissertation submitted in partial fulfillment of requirements for a degree must be presented in its final form by the deadline set by the school concerned. Accepted theses and dissertations, with accompanying drawings, become the property of the University and are deposited in the University's Gelman Library, where the duplicate copies are bound and made available for circulation. See the appropriate school in this Bulletin for regulations governing theses and dissertations.

The Library

All students registered in the University have the privilege of using the University's Gelman Library. Its stacks are open, and all students are welcome to browse. Authorized GW identification is needed to enter the library and to borrow books.

Any book that circulates is subject to recall by the library if needed for reserve or requested by another user after a minimum of 20 days. Reserve books must be used in the library, except that they may be withdrawn for overnight use two hours before closing time. Transcripts of grades are withheld until a student's library record is clear, with all borrowed books returned and any fines paid.

All students using the University's Gelman Library are expected to be familiar with its detailed regulations, available at any of the library's service desks.

Right to Dismiss Students

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

Right to Change Rules

The University reserves the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

Right to Make Changes in Programs

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

University Policy on the Release of Student Information

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive students' written consent before releasing information from their education records to persons outside the University, except as provided by the Act and except for directory information as indicated below (information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency); and

4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of emergency contact; dates of attendance; school or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height, weight, and age of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information is published in the *Guide to Student Rights and Responsibilities*, available in the Office of the Dean of Students.

Property Responsibility

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the University Police Office.

University Policy on Drugs

The University cannot condone violations of law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

FEES AND FINANCIAL REGULATIONS

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution makes up the difference.

The following fees and financial regulations were adopted for on-campus programs for the academic year 1998–99. Information on tuition and fees for off-campus programs is published separately by the Division of University Programs. Information on tuition and fees for the summer is published in the Summer Sessions Announcement.

Tuition Fees

For on-campus graduate study in Columbian School of Arts and Sciences, the School of Business and Public Management, the Graduate School of Education and Human Development, the School of Engineering and Applied Science, the Elliott School of International Affairs, and the Division of University Programs: Graduate students and nondegree students taking credit courses at all levels are charged $680 per credit hour on the main campus and $575 per credit hour at the Virginia campus. Doctoral study in the School of Business and Public Management is charged at the rate of $9,734 for two semesters.

Four Virginia campus programs are each charged at a single fee for the full program: in the School of Business and Public Management, the Executive Master of Science in Information Systems, $27,960, and the Executive Master of Business Administration, $56,500; in the School of Engineering and Applied Science, the Master of Science in the field of Telecommunications and Computers, Weekend Program, $27,960; in the Graduate School of Education and Human Development, the Executive Leadership in Human Resource Development, leading to the Doctor of Education, $44,320.

University Fee (charged all students registered on campus)—$34.50 per credit hour, to a maximum of $517.50 per semester.

Continuing Research—All master's and doctoral students who have completed their required number of credits (including course work and thesis or dissertation research) must register each subsequent fall and spring semester for 1 credit hour of Continuing Research as specified by the regulations of the school concerned.

Additional Course Fees—Some courses carry additional fees, such as laboratory or material fees, charged by semester as indicated in course descriptions.

Special Fees and Deposits (Nonrefundable)

Application fee (all degree candidates)	$55
Late registration beginning the first week of the semester	80
Registration for continuous enrollment or leave of absence	35
Graduation fee	35
Late payment fee (see Payment of Fees, below)	100
Returned check fee, charged a student whose check is improperly drawn, incomplete, or returned by the bank for any reason	75
Microfilm service and binding dissertation	25
Elliott School of International Affairs fee (payable over four semesters [fall and spring] at $625 per semester for Master of Arts candidates and over two semesters [fall and spring] at $1,250 per semester for Master of International Policy and Practice candidates)	30
	130
	2,500

	8
Engineers' Council fee (charged all SEAS students), per semester	15
English test for international students (when required)	5
Transcript fee	25
Replacement of lost or stolen picture identification card	50
Replacement of diploma	

Payment of tuition for thesis or dissertation research entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis or dissertation is to be written.

Postdoctoral Study

Those who have graduated from George Washington University with a Ph.D., Ed.D., or D.Sc. may continue any studies in the University without payment of tuition (contingent upon the availability of space) and may enjoy all University library privileges. Such graduates are required to pay the prevailing charge for one credit hour, as well as the University fee, in order to establish their active membership in the University. The use of laboratory space and equipment is contingent upon availability, and the cost of all laboratory or special library material is paid by the graduate. Special arrangements for such privileges must be made with the dean two months in advance of the semester in which the graduate wishes to register. Postdoctoral work taken under this privilege may not be taken for credit.

Payment of Fees

A student who registers for classes in any semester or session incurs a financial obligation to the University. Payment of tuition and fees, as detailed on the Schedule and Invoice, is due approximately two weeks prior to the first day of classes. Changes to registration that affect charges to the student's account must be recorded through the Office of the Registrar. In addition to payment of tuition and fees, the University requires that a student confirm his or her registration. Students whose registrations are not confirmed by the third week of the semester may be canceled from all courses. Receipt of the tear-off portion of the Schedule and Invoice, typically mailed with the student's payment, is requested for confirmation of registration. All students whose registrations are not confirmed are notified in writing that their registrations will be canceled and are asked to contact the Student Accounts Office immediately.

Charges for residence halls and meal plans are in accordance with lease agreements signed by the student. Questions concerning those charges should be referred to the Community Living and Learning Center.

The University offers several options for payment of tuition and fees in addition to payment in full upon receipt of the Schedule and Invoice or at the time of registration.

Deferred Payment Plan—Any student registered for 6 or more credit hours may be eligible to participate in this plan. Advance arrangements are not required. Students who receive GW employee tuition benefits or departmental scholarship awards are not eligible to participate in this plan unless the student's balance after awards are deducted is greater than $3,000. An eligible student may use the deferred payment plan by paying the minimum amount due for the semester as specified. The remaining balance plus accrued interest is due by the eighth week of classes. Interest on unpaid balances is charged at the rate of 12% per annum beginning the first day of classes each semester. If payment in full is not received by the end of the eighth week of the semester, interest will con-

tinue to accrue at the rate previously stated and the account will be assessed a $50 late payment fee.

Monthly Payment Plan—The University's payment plan is open to all students and is available for the fall and spring semesters only. Students must complete and submit an application by August 15 for the academic year or by January 5 for the spring semester to participate in the plan. Upon approval of the application, the University will furnish coupons and return address labels for each payment. The monthly payment plan for the academic year begins in June and ends in March, with the first five payments applied to the fall account and the second five applied to spring. For spring semester only, the plan begins in November and ends in March. Under the plan, all payments are due on the first of each month. The student will receive a monthly bill, but no interest or late fees will be charged provided payments are received as scheduled. Students who enroll in the plan after the first month must make up all payments to the month of enrollment. Interest and a $50 late payment fee are assessed all accounts not paid in full by October 1 for fall and March 1 for spring.

Third-Party Billing—The University accepts employer vouchers or purchase orders that are not contingent upon receipt of grades. Under all circumstances, however, the charges for tuition and fees remain the responsibility of the student. Should a sponsor fail to remit payment to the University, the University will contact the student for payment. A student whose employer or sponsor reimburses him or her for tuition and fees after receipt of grades must pay in full by the stated due date to avoid interest, late fees, and/or cancellation of registration. Students whose tuition is paid in full or part by employee benefits or teacher tuition remission must pay any remaining balance by the stated due date to avoid interest, late fees, and/or cancellation of registration.

Accounts that are past due are encumbered by the University. A student whose account is encumbered may not register for future semesters and may not receive diplomas or transcripts. Accounts that are more than 90 days past due are referred to an agency for collection. The student is then responsible for all charges due the University as well as all collection costs incurred by the agency.

A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee.

Withdrawals and Refunds

Applications for withdrawal from the University or from a course after the registration period must be made in writing to the dean of the school or division and to the registrar. Notification to an instructor is not an acceptable notice (see Withdrawal under University Regulations). Financial aid recipients must notify the Office of Student Financial Assistance in writing.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters.

1 *Complete withdrawal from all courses (on-campus students):*

Withdrawal dated on or before the end of the first week of the semester	80%
Withdrawal dated on or before the end of the second week of the semester	60%
Withdrawal dated on or before the end of the third week of the semester	40%
Withdrawal dated after the fourth week of the semester	25%
	None

2 *Partial withdrawal.* If the change in program results in a lower tuition charge, the refund schedule above applies to the difference.

3 Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

4 *Summer Sessions.* In cases of authorized withdrawals from courses, refunds of 75% of tuition and fees will be made for courses dropped within the first

seven calendar days of the start of a session. No refund will be made for courses dropped thereafter.

The above information regarding cancellation of tuition charges and fees after withdrawal from the University may not apply to entering students who are recipients of federal aid; those students should check with the Student Accounts Office for the applicable cancellation schedule.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education. Federal regulations require that financial aid recipients use such refunds to repay financial aid received for that semester's attendance. This policy applies to institutional aid as well.

In no case will tuition be reduced or refunded because of absence from classes.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

INDEX

Abbreviations, key to, 76
Academic integrity, 330
Accountancy, 77, *see also* School of Business and Public Management
Accreditation, 9
Administration, officers of, 13
Administrative sciences, 79
Admissions, *see* school concerned
Advanced standing, *see* school concerned
Alumni association, 11
American studies, 82
Anatomy and cell biology, 85
Anthropology, 85
Applied mathematics, *see* Mathematics
Applied science, 89
Art, 89
Art therapy, 93
Assistantships, 321
Auditing, 331
Awards (Prizes), 326
Biochemistry and molecular biology, 95
Biological sciences, 97
Biomedical sciences, 99
Biostatistics, 100
Board of trustees, 11
Business and Public Management, School of, 26
Calendar, 5
Career center, 318
Changes in program of study, 333
Clinical toxicology, *see* Forensic sciences and Chemistry
Chemistry, 100
Chinese, *see* East Asian languages and literatures
Civil and environmental engineering, *see* School of Engineering and Applied Science
Civil, mechanical, and environmental engineering, 103
Columbian School of Arts and Sciences, 16
Computational sciences, 116
Computer information and resource center, 318
Computer science, *see* Electrical engineering and computer science, *see also* School of Engineering and Applied Science, School of Business and Public Management, Management Science, and Mathematics
Conduct, regulations concerning, 330
Consortium of universities, 10, 328
Consultants in research, 309
Continuous enrollment, 332, *see also* school concerned
Counseling human and organizational systems, 116, *see also* Graduate School of Education and Human Development
Counseling center, 317
Course numbers, explanation of, 76
Courses of instruction, 75
Credit, 331
Criminal justice, *see* Forensic sciences
Dean of students, office of, 316
Disability support services, 318
Dismissal of students, 330, 333, 334
Dissertation requirements, 333, *see also* school concerned
Division of University Programs, 313
Doctor of Medicine, combined degree program, 20
East Asian languages and literatures, 121
East Asian studies, 121
Economics, 122
Education and Human Development, Graduate School of, 41
Educational leadership, 127
Electrical engineering and computer science, 133, *see also* School of Engineering and Applied Science
Elliott School of International Affairs, 67
Engineering and Applied Science, School of, 84
Engineering management, 147, *see also* School of Engineering and Applied Science
Engineering science, *see* Civil, mechanical, and environmental engineering
English, 152
English, test of, as a foreign language (TOEFL), *see* school concerned
Environmental engineering, *see* School of Engineering and Applied Science
Environmental and resource policy, 154
Epidemiology, 155
Equal opportunity, university policy on, 8
European studies, 156
Executive programs, *see* Virginia campus
Faculty and staff of instruction, 259
Fees and financial regulations, 335
Fellowships, 322
Finance, 156, *see also* School of Business and Public Management
Financial aid, 321
Financial regulations, 335
Fine arts, *see* Art
Folger Institute for renaissance and 18th-century studies, 25
Folklife, *see* American studies
Forensic sciences, 159
Genetics, 164
Geobiology, 165
Geochemistry, *see* Chemistry and Geology
Geography, 165
Geology, 167

Grades, 329; *see also* school concerned
Graduation, 332; *see* Calendar for date
Health and accident insurance, 317
Health service, student, 317
Historic preservation, *see* American studies
History, 169
Housing, 317
Human resource development, *see* Counseling/human and organizational studies; *see also* Graduate School of Education and Human Development
Human resources management, *see* Administrative sciences and School of Business and Public Management
Human sciences, 173
Incomplete authorized withdrawal, 329
Incomplete, removal of, *see* school concerned
Information systems, *see* School of Business and Public Management, School of Engineering and Applied Science, and Virginia campus
Institute for European, Russian, and Eurasian studies, 74
Insurance, health and accident, 317
International Affairs, Elliott School of, 67
International affairs (courses), 174
International business, 176; *see also* School of Business and Public Management
International development studies, 178
International services, 318
International trade and investment policy, 178
Internships, 322
Latin American studies, 179
Law School, *see* Law School Bulletin
Leave of absence, 332; *see also* school concerned
Legislative affairs, 179
Libraries, 10, 333
Loans, 324
Management science, 179
Marketing, 187; *see also* School of Business and Public Management
Master's comprehensive examinations, *see* school concerned
Mathematics, 189
Mechanical engineering, *see* Civil, mechanical, and environmental engineering; *see also* School of Engineering and Applied Science
Medicine and Health Sciences, School of, *see* School of Medicine and Health Sciences Bulletin
Microbiology and immunology, 192
Molecular and cellular oncology, 193
Museum education, 42
Museums and material culture, *see* American studies
Museum studies, 194
Museum training, *see* Anthropology and Art
Neuroscience, 195
Nondegree status, 314
Off-campus degree programs, *see* Division of University Programs
Office of fellowships and graduate student support, 321
Office of university students, 314
Officers of administration, 13
Operations research, 196; *see also* School of Engineering and Applied Science
Pharmacology, 199
Philosophy, 200
Physics, 201
Political management, 203
Political psychology, 206
Political science, 207
Post-admission transfer credit, 331
Postdoctoral study, 336
Prizes, 326
Professional psychology, 212
Psychology, 215
Public administration, 219; *see also* School of Business and Public Management
Public policy, 226
Radiological sciences, 223
Refunds, 337
Registration, 328
Regulations, University, 328; *see also* Fees and financial regulations, and school concerned
Release of student information, University policy on, 333
Religion, 224
Religious life, 320
Research centers and institutes, 312
Residence requirements, *see* school concerned:
CSAS, 21, 23
SBPM, 29
GSEHD, 48, 50, 51
SEAS, 56
ESIA, 71, 72
Romance languages and literatures, 226
Rules of the University, right to change, 333
Russian and East European studies, 226
Scholarship requirements, 329; *see also* school concerned
Scholarships, *see* Financial aid
Science, technology, and public policy, 226
Security policy studies, 227
Senate, Faculty, 15
Smithsonian Institution, cooperative program, 25, 84
Sociology, 227
Special education, *see* Teacher preparation and special education; *see also* Graduate School of Education and Human Development

Speech and hearing, 229
Speech and hearing center, 317
Speech–language pathology and audiology, *see* Speech and hearing
Statistics, 232
Strategic management and public policy, 235
Student employment, 318, 325
Student government, 319
Student health service, 317
Student services, 316
Summer sessions, 316; *see also* Summer Sessions Announcement
Suspension, *see* school concerned
Taxation, *see* School of Business and Public Management
Teacher education, *see* Teacher preparation and special education; *see also* Graduate School of Education and Human Development
Teacher preparation and special education, 237
Telecommunication, 246
Telecommunications and computers, *see* School of Engineering and Applied Science
Television, GW, 11
Test of English as a foreign language (TOEFL), *see* school concerned
Theatre and dance, 247
Thesis requirements, 333, *see also* school concerned
Tourism and hospitality management, 248, *see also* School of Business and Public Management
Transcripts of record, 331
Transfer within the University, 331
Tuition, 335
University Professors' courses, 249
University regulations, 328
Veterans benefits, 326
Virginia campus, 252
Washington area studies, center for, 26
Withdrawal, 329, 331, 337; *see also* school concerned
Women's studies, 257
Writing center, 318

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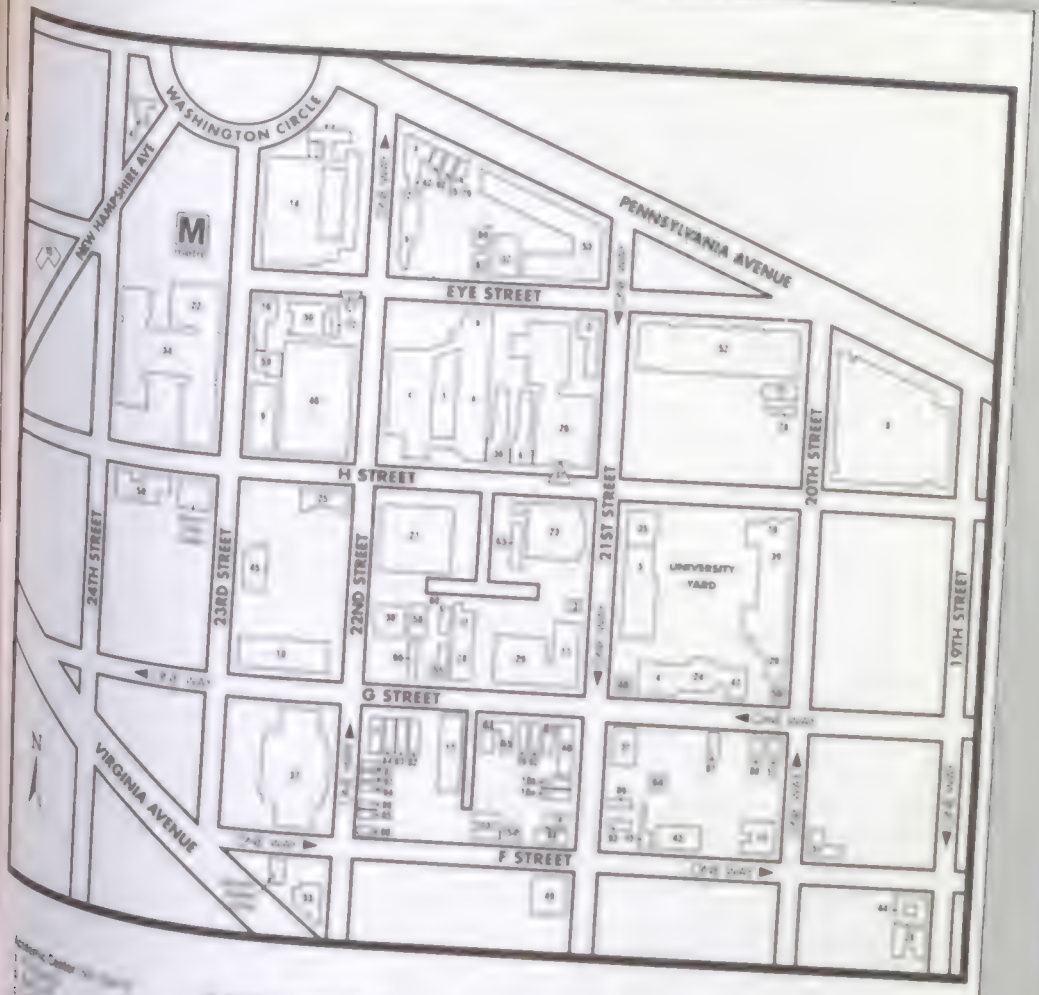
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School of Public Health and Health Services: Bachelor of Science (B.S.), Master of Science (M.S.), Master of Public Health (M.P.H.), Master of Health Services Administration (M.H.S.A.), Specialist in Health Services Administration (Spec.H.S.A.), and Doctor of Public Health (Dr.P.H.)



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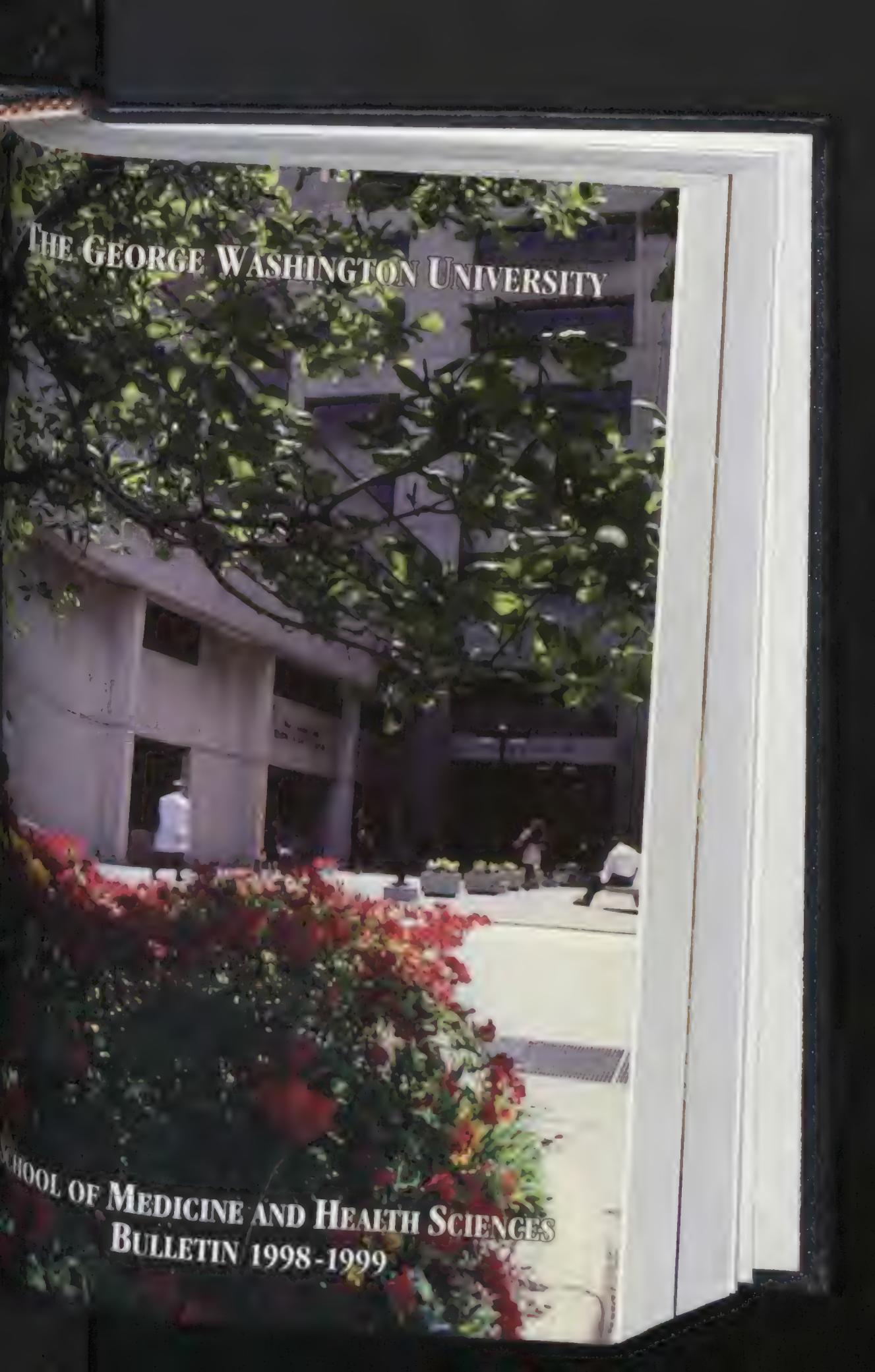
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THE GEORGE WASHINGTON UNIVERSITY
SCHOOL OF MEDICINE AND HEALTH SCIENCES
BULLETIN 1998-1999



The George Washington University
School of Medicine and Health Sciences Bulletin
May 1998

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THE GEORGE WASHINGTON UNIVERSITY

SCHOOL OF MEDICINE AND HEALTH SCIENCES BULLETIN

1998–1999



Please address correspondence to the office concerned at The George Washington University, Washington, D.C. 20052, telephone (202)994-1000. If you are addressing the School of Medicine and Health Sciences or the School of Public Health and Health Services, the zip code is 20037. For information concerning Undergraduate Programs, Graduate Programs, the Law School, or the Summer Sessions, please request the appropriate Bulletin.

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Information in this Bulletin is generally accurate as of January 1998. The University reserves the right to change courses, programs, and fees, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.

Contents

4 The University
8 The School of Medicine and Health Sciences
23 The Doctor of Medicine Degree Program
46 Health Sciences Programs
62 Courses of Instruction
63 Anatomy and Cell Biology
64 Anesthesiology
64 Biochemistry and Molecular Biology
64 Computer Medicine
65 Dermatology
68 Emergency Medicine
74 Health Care Sciences
75 Health Sciences
76 Interdisciplinary Courses
78 Medicine
78 Microbiology and Immunology
78 Neurological Surgery
79 Neurology
79 Obstetrics and Gynecology
79 Ophthalmology
79 Orthopaedic Surgery
81 Pathology
82 Pediatrics
82 Pharmacology
83 Physiology and Experimental Medicine
83 Psychiatry and Behavioral Sciences
86 Radiology
87 Surgery
88 Urology
98 Faculty and Staff of Instruction
Index

The University

History and Organization

The George Washington University had its beginning in 1821 as the Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to the George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice and theory of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of the Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character, it provided "That persons of every religious denomination shall be capable of being elected Trustees, nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College its activities were centered on College Hill, a tract of forty-six and one-half acres between the present Fourteenth and Fifteenth Streets extending north from Boundary Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half-century, the University's present plant has been developed in that section of the old First Ward familiarly known as Foggy Bottom, between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. Within a few blocks are the White House, the Department of the Interior, the State Department, the World Bank, and many other governmental offices and international agencies. The area has many reminders of historic interest to the University. President Monroe, who signed the charter, lived at 2017 I Street. The first president of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and I Streets, and Washington selected Twenty-third and I Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian School of Arts and Sciences, the professional schools, which include the Law School, the Elliott School of International Affairs, the Graduate School of Education and Human Development, and the Schools of Medicine and Health Sciences, Engineering and Applied Science, Business and Public Management, and Public Health and Health Services.

Academic Status

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools. The University is on the approved list of the American Association of University Women and is a member of the College Board.

The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. Its Doctor of Medicine degree is recognized by all state and territorial medical licensure boards in the United States. The Commission on Accreditation of Allied Health Education Programs has accredited the health sciences programs in diagnostic medical sonography and physician assistant. The clinical laboratory science program is accredited by the National Accrediting Agency for Clinical Laboratory Science. The Joint Review Committee for Nuclear Medicine Technology has accredited the nuclear medicine technology program. The radiation therapy program is accredited by the Joint Review Committee on Education in Radiologic Technology.

University Policy on Equal Opportunity

George Washington University does not unlawfully discriminate against any person on the basis of race, color, religion, sex, national origin, age, disability, veteran status, or sexual orientation. This policy covers all programs, services, policies and procedures of the University, including admission to educational programs and employment. The University is also subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Associate Vice President for Human Resources, George Washington University, Washington, D.C. 20052, (202) 994-4435, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

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History

The School of Medicine and Health Sciences of The George Washington University has a distinguished history that goes back more than a century and a half. In March 1825 the School opened with the intention of building "a medical school commensurate with the progress and demands of a rising metropolis, and the improvement of service throughout the country." The School, the eleventh oldest medical school in the country, has met this responsibility by providing its students with a foundation in the medical sciences on which they have built careers in practice, teaching, research, or administration.

In 1844 the School took on a new dimension when Congress granted it the use of the Washington Infirmary. Thus, one of the earliest general teaching hospitals in the nation was established in Washington.

The distinguished history of The George Washington University School of Medicine and Health Sciences closely parallels the academic advances and medical progress of the nation. The School has contributed to both

The George Washington University Medical Center, established in 1966, consists of Walter G. Ross Hall, which houses the School of Medicine and Health Sciences; the Paul Himmelfarb Health Sciences Library; the University Hospital; the H.B. Burns Memorial Building, which houses the Medical Faculty Associates; and the Helen L. and Mary E. Warwick Memorial Building

In 1973, with the introduction of undergraduate programs in health sciences, the name of the School was officially changed from the School of Medicine to the School of Medicine and Health Sciences.

In 1997, the School of Public Health and Health Services was formed, parallel to the School of Medicine and Health Sciences. The two schools reside within the Medical Center and report to the University through the Vice President for Health Affairs to ensure coordination of both schools' programs, to facilitate education across disciplines, to enhance the prevention, assessment, and treatment of illness and disease by a variety of highly trained professionals, and to advance the science and technology of medicine and health care.

Within the School of Medicine and Health Sciences, research is organized in three major institutes: the Institute for Biomedical Sciences, the Institute for Clinical Research and Clinical Trials, and the Institute for Health Policy, Outcomes, and Human Values.

Mission

The mission of The George Washington University School of Medicine and Health Sciences is to advance knowledge and to educate and train scientifically astute, highly competent and compassionate physicians, health care and public health professionals, and researchers for the 21st century. Our graduates will be esteemed generalists as well as specialist practitioners, researchers, educators, and policy-makers, ready to lead in the development and implementation of new health care techniques and delivery systems, and to serve their patients and society. We will implement this mission by building on our history and heritage, remaining true to our core values, and responding to the changing context of contemporary medical education and health care delivery.

University Regulations

Students enrolled in the University are required to conform to the following regulations and to comply with the rules and regulations of the college, school, or division in which they are registered.

Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reenter and continue work only under the regulations and requirements in force at the time of return.

If students knowingly make false statements or conceal material information on applications for admission, registration forms, or any other University documents, students' registrations may be canceled. If such falsification is discovered after students have matriculated at the University, students may be subject to dismissal from the University. Such students will be ineligible (except by special action of the faculty) for subsequent registration in the University.

Registration

Attendance in class requires compliance with the School's registration deadlines.

University Policy on the Release of Student Information

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by

educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive students' written consent before releasing information from their education records to persons outside the University, except for directory information as indicated below (information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency); and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of next of kin; dates of attendance; school or division of enrollment; field of study; credit hours earned; degrees earned, honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics), and height, weight, and age of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information may be obtained from the Office of the Registrar.

Right to Dismiss Students

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes whenever, in the interest of the student or the University, the University administration deems it advisable.

Right to Change Rules

The University and its schools reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

Right to Make Changes in Programs

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

University Policy on Drugs

The University cannot condone violations of law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken to protect the interests of the University and the rights of others.

The Libraries

Students have the privilege of using the University's Gelman Library and the Himmelfarb Health Sciences Library. The stacks are open, and all students are welcome to browse at their leisure. A card denoting approved enrollment for the current semester must be presented when books are borrowed for outside use. All students using the libraries are expected to be familiar with the regulations governing their use, which are available at each library.

Property Responsibility

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the University Police Office.

Fees and Financial Regulations

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution makes up the difference.

The following fees and financial regulations were adopted for the academic year 1998–99. Costs are expected to increase in subsequent years.

Tuition Fees

New M.D. candidates, for the academic year	$31,800*
Continuing M.D. candidates, for the academic year	31,200
Students in health sciences programs	†

University Fee—The University fee is charged all students registered on campus at a rate of $34.50 per credit hour, to a maximum of $517.50 per semester.

Additional Course Fees—Some courses carry additional fees, such as laboratory or material fees, charged by semester as indicated in course descriptions.

Cost of Textbooks and Equipment for M.D. Candidates—The average cost of textbooks and equipment (such as a microscope, glass slides, clinical thermometer, stethoscope, hemocytometer, and lab coats) is approximately as follows: first year, $1,900; second year, $1,265; third year, $600; and fourth year, $350. These averages include shared microscope rental.

Special Fees and Deposits (Nonrefundable)

Application fee (M.D. degree candidates)	$75
Application fee (health sciences degree and certificate candidates)	55
Advance tuition deposit, charged each entering M.D. student (includes $100 deposit due after May 1)	3,000
Advance tuition deposit, charged each entering or readmitted student in the physician assistant program	500
Advance tuition deposit, charged each entering or readmitted health sciences student, excluding physician assistant	200
Freshman orientation fee, charged each entering freshman in health sciences	150
Orientation fee, charged each entering health sciences graduate student and undergraduate transfer student	75
Late registration beginning the first week of the semester	80
Application for continuous enrollment or leave of absence	55
Graduation fee	100
Late payment fee (see Payment of Fees, below)	75
Returned check fee, charged a student whose check is improperly drawn, incomplete, or returned by the bank for any reason	25
Fee for departmental examination to qualify for receiving credit (or advanced standing), waiver of requirement, or both	100
Fee for examination to qualify for advanced placement	25

* Candidates who take courses offered by other schools of the University during the summer pay tuition charges as outlined in the *Summer Sessions Announcement*.

† Fees for health sciences students vary by program and location. Please check with the Health Sciences Programs for specific rates.

English test for international students (when required) 15
Laboratory check-out fee, for failure to check out of chemistry laboratory by the deadline date set by the instructor (a student who drops a chemistry course before the end of the semester must check out of the laboratory at the next laboratory period) 10
Transcript fee 5
Replacement of lost or stolen picture identification card 25
Replacement of diploma 50

Payment of Fees

M.D. Program—The annual tuition fee for the M.D. program is payable in two equal installments on or before registration day for each semester. M.D. students who register during the summer for courses offered in other divisions of the University are charged the regular summer tuition and other fees.

All Other Programs—Except for the M.D. program, tuition and fees will be assessed each semester on the basis of the program of studies for which the student registers.

A student who registers for classes in any semester or session incurs a financial obligation to the University. Payment of tuition and fees, as detailed on the Schedule and Invoice, is due approximately two weeks prior to the first day of classes. Changes to registration that affect charges to the student's account must be recorded through the Office of the Registrar. In addition to payment of tuition and fees, the University requires that a student confirm his or her registration. Students whose registrations are not confirmed by the third week of the semester may be canceled from all courses. Receipt of the tear-off portion of the Schedule and Invoice, typically mailed with the student's payment, is requested for confirmation of registration. All students whose registrations are not confirmed are notified in writing that their registrations will be canceled and are asked to contact the Student Accounts Office immediately.

Charges for residence halls and meal plans are in accordance with lease agreements signed by the student. Questions concerning those charges should be referred to the Community Living and Learning Center.

The University offers several options for payment of tuition and fees in addition to payment in full upon receipt of the Schedule and Invoice or at the time of registration.

Deferred Payment Plan—Any student registered for 6 or more credit hours may be eligible to participate in this plan. Advance arrangements are not required. Students who receive GW employee tuition benefits or departmental tuition awards are not eligible to participate in this plan unless the student's balance after awards are deducted is greater than $3,000. An eligible student may use the deferred payment plan by paying the minimum amount due for the semester as specified. The remaining balance plus accrued interest is due by the eighth week of classes. Interest on unpaid balances is charged at the rate of 12% per annum beginning the first day of classes each semester. If payment in full is not received by the end of the eighth week of the semester, interest will continue to accrue at the rate previously stated and the account will be assessed a $50 late payment fee.

Monthly Payment Plan—The University's payment plan is open to all students and is available for the fall and spring semesters only. Students must complete and submit an application by August 15 for the academic year or by January 5 for the spring semester to participate in the plan. Upon approval of the application, the University will furnish coupons and return address labels for each payment. The monthly payment plan for the academic year begins in June and ends in March, with the first five payments applied to the fall account and the second five applied to spring. For spring semester only, the plan begins in

November and ends in March. Under the plan, all payments are due on the first of each month. The student will receive a monthly bill, but no interest or late fees will be charged provided payments are received as scheduled. Students who enroll in the plan after the first month must make up all payments to the month of enrollment. Interest and a $50 late payment fee are assessed all accounts not paid in full by October 1 for fall and March 1 for spring.

Third-Party Billing—The University accepts employer vouchers or purchase orders that are not contingent upon receipt of grades. Under all circumstances, however, the charges for tuition and fees remain the responsibility of the student. Should a sponsor fail to remit payment to the University, the University will contact the student for payment. A student whose employer or sponsor reimburses him or her for tuition and fees after receipt of grades must pay in full by the stated due date to avoid interest, late fees, and/or cancellation of registration. Students whose tuition is paid in full or part by employee benefits or teacher tuition remission must pay any remaining balance by the stated due date to avoid interest, late fees, and/or cancellation of registration.

Accounts that are past due are encumbered by the University. A student whose account is encumbered may not register for future semesters and may not receive diplomas or transcripts. Accounts that are more than 90 days past due are referred to an agency for collection. The student is then responsible for all charges due the University as well as all collection costs incurred by the agency.

A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee.

Withdrawals and Refunds

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the dean. Notification to an instructor is not an acceptable notice. Financial aid recipients must notify the Office of Student Financial Aid in writing.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. *Complete withdrawal from all courses* (on-campus students)

Withdrawal dated on or before the end of the first week of classes	80%
Withdrawal dated on or before the end of the second week of classes	60%
Withdrawal dated on or before the end of the third week of classes	40%
Withdrawal dated on or before the end of the fourth week of classes	25%
Withdrawal dated after the fourth week of classes	None

2. *Partial withdrawal.* If the change in program results in a lower tuition charge, the refund schedule above applies to the difference.
3. *Withdrawal from Year III of the M.D. program.* The school is aware that a student wishing to transfer to another university between the second and third years of the M.D. program may need to register for Year III at this School before receiving word of acceptance from the intended new program. Therefore, if a student has informed the School that he or she is attempting to transfer and learns that the transfer application has been successful only after registering for Year III at this University, the following refund schedule will apply:

Withdrawal dated on or before the end of the fourth week of Year III classes	100%
Withdrawal dated on or before the end of the eighth week of Year III classes	90%
Withdrawal dated after the eighth week of Year III classes	None

Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

5. *Summer Sessions.* In cases of authorized withdrawals from courses, refunds of 75% of tuition and fees will be made for courses dropped within the first seven calendar days of the start of a session. No refund will be made for courses thereafter.
6. *Refund schedule for off-campus students*
   After the first class meeting, but before the third class meeting 80%
   After the third class meeting, but before the fifth class meeting 50%
   After the fifth class meeting ..... None
   No refund will be made for sessions of less than 21 days

The above information regarding cancellation of tuition charges and fees after withdrawal from the University may not apply to entering students who are recipients of federal aid, those students should contact the Student Accounts Office for the applicable cancellation schedule.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education. Federal regulations require that financial aid recipients use such refunds to repay financial aid received for that semester's attendance. This policy applies to institutional aid as well.

In no case will tuition be reduced or refunded because of absence from classes.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

Student Life

The Office of the Vice President for Student and Academic Support Services establishes policy and procedures for those departments that affect student life, including the Dean of Students, Community Living and Learning Center, Student Financial Assistance, Student Health Service, Counseling Center, Career Center, Multicultural Student Services Center, International Services, Disabled Student Services, and Student Activities Center. Detailed information is contained in the *Student Handbook*.

Student Health Service

The Student Health Service is an outpatient clinic staffed by physicians, nurse practitioners, and physician assistants who can evaluate and treat most of students' medical problems. Visits should be arranged by appointment, urgent problems may be seen on a walk-in basis if necessary. Charges may be incurred for lab work, immunizations, allergy injections, and medication. Psychiatric evaluation and short-term therapy appointments and crisis intervention are available. Health education and outreach programs on a variety of topics are provided throughout the year.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. All fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and continuing education programs are not eligible. Bills incurred from all services rendered outside the Student Health Service (for example, x-ray work, laboratory work, and office visits to private physicians) are the responsibility of the student.

Health and Accident Insurance—The University recommends that all students be covered by health and accident insurance. For information on group health insurance options through the University, students should contact the Student

Health Service or Office of the Dean of Students. All students in the M.D. and health sciences programs are required to have health and accident insurance.

Campus Housing

Complete information concerning the University's residence halls is available from the GW Community Living and Learning Center. The Center offers safe residence hall facilities and a diverse range of community living environments and student development programs. Contained within the CLLC are the areas of Student Judicial Services and Substance Abuse Prevention.

Admission to the University does not include a room reservation. Students wishing to live on campus must submit an application for residence hall space or apartment accommodation along with a $300 nonrefundable deposit. The housing deposit is credited toward the first semester's room or apartment charge.

Rooms and apartments are leased for the academic year, with assignments on a first-come, first-served basis. Lease payment must be made in early June for the fall semester, unless the student elects the 10-month payment plan.

Charges for residence hall space are determined by hall and room size, with the 1997–98 most prevalent cost set at $4,590 for the academic year. In apartment halls, the most prevalent charge per student is set at $5,440 for the academic year, with prices ranging higher and lower according to the space provided. Exact costs for the 1998–99 academic year will be announced.

A wide variety of off-campus housing is available in the Washington metropolitan area. The Medical Center's location at the Foggy Bottom metro stop makes it easily accessible via public transportation. The GW Community Living and Learning Center offers an Off-Campus Housing Resource web site, which includes daily housing listings, transportation information, and a movers' guide. The web site address is http://www.och.gwu.edu.

Food Service

Freshmen and sophomores in residence halls are required to choose a food service plan. Freshmen may choose from a number of plans (including a kosher meal plan) that range from $2,020 to $3,121 for the 1997–98 academic year. Sophomores may choose from a more extensive range of plans. At a later date, costs for the 1998–99 academic year will be announced by the Department of Auxiliary and Institutional Services, which operates food service at the University.

University Counseling Center

The University Counseling Center was established to help students resolve personal, social, career, and study problems that can interfere with their academic success. Services include workshops and groups on topics that include study skills, procrastination prevention, stress management, conflict management, time management, and self-esteem; clinical services, including crisis intervention, brief personal counseling, and referral assistance; and consultation and training programs for student, faculty, and staff groups. Career counseling, vocational testing, and referral services are available to GW students, faculty, staff, alumni, and individuals from the greater Washington community.

Career Center

The Career Center promotes effective career planning, teaches job search strategies, and facilitates contact between prospective employers and GW students and alumni through its many services. Services include full- and part-time job listings, internship listings, career consulting, workshops (including Job Search Strategies, Resumes and Resumes, and Effective Interviewing); a career resource library; campus interviewing; a resume referral service; resume critiques, student employment,

RESUMIX services; computer- and Internet-based job resources; cooperative education; and a credentials service that supports graduate/professional school applications

Speech and Hearing Center

The Speech and Hearing Center provides diagnosis and treatment of a wide range of speech, language, and hearing disorders. These include developmental impairments of articulation and language, stuttering, voice disorders, and speech and language impairments resulting from neurological damage. Services are available for persons wishing to modify a regional dialect or foreign accent. Evaluation and aural rehabilitation are also provided for hearing-impaired individuals. The Speech and Hearing Center operates in conjunction with the Department of Speech and Hearing.

Writing Center

In conjunction with the Department of English, the Writing Center provides writing instruction to GW students at all levels of experience and expertise. Students are assisted in identifying writing problems and learning how best to express ideas. Trained tutors (undergraduate peer tutors, graduate students, and the director and other members of the faculty) work with students individually on areas of specific need or interest. Tutors provide assistance in such areas as organizing a mass of information efficiently and clearly, using correct grammar and punctuation, getting started on a writing project, developing a thesis, providing evidence to support an argument, and presenting the findings of an experiment or the solution to a research problem.

Disability Support Services

The Disability Support Services Office works to ensure that the special services necessary for disabled students to participate fully in their academic programs and extracurricular life are provided for them through University or community resources.

Multicultural Student Services Center

The Multicultural Student Services Center provides academic, co-curricular, and personal support services for all GW minority students to enhance minority student life at GW. Through the Center, minority students receive orientation to various University resources, and are made aware of the many cultural activities and programs that exist on campus and in the greater metropolitan area. The Center provides professional and peer counseling, course advising, tutorial services, and campus and community mentoring programs. The staff is available to address students' academic and personal concerns.

In addition, the Center enhances the quality of ethnic minority student life through sponsoring co-curricular activities and leadership training. The Center houses a resource center with computers for student use, reference books and instructional materials, a test file, and an information center. The Multicultural Student Services Center oversees the Partners in Academics and Leadership Program (formerly the Educational Opportunity Program) and various preparatory and pre-college programs.

International Services Office

The International Services Office provides services to GW's international students, scholars, faculty, and staff. The office provides advising on a variety of personal issues, including cultural adjustment, living conditions, academic concerns, and

finances; provides immigration assistance and information on U.S. government requirements and regulations specific to the international community, conducts orientation programs to assist in living, studying, and working in the United States, and serves as a resource center to the University community on issues of cross-cultural understanding.

Religious Life

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the religious organizations of their choice. Several religious bodies sponsor various groups and form a link between the University and the religious community. The advisors of the religious organizations are available for counseling and together constitute the Board of Chaplains to enhance religious life on campus. Religious services and special observations are also provided for the University community as announced.

The Cloyd Heck Marvin Center

The Marvin Center is the GW campus community center. The Marvin Center offers programs, services, and facilities for students, faculty, staff, alumni, and University guests. The Center's wide range of facilities includes dining locations, a theatre/lounges, recreational facilities, study rooms, conference and meeting rooms, Information Center, Colonnade Gallery, travel agency, computer store, bookstore, and Student Organization Resource Center. The Marvin Center provides facilities for programs conducted by the University Program Board, by academic departments that include the performing arts, and by other University organizations. The operation of the Marvin Center is overseen by Administrative Services within Student and Academic Support Services.

The Marvin Center Governing Board, which oversees the Center's policies, is a representative body composed of students, faculty, staff, and alumni. The Board works closely with the Center's staff in the review and development of policies, guidelines, and procedures that direct the operation of the Center.

Student Activities Center

The Student Activities Center furthers the educational mission of the University by offering programs, services, and facilities that foster the social and cultural development and school spirit of members of the University community. Staff members assist individual students and campus organizations with event planning, program coordination, and participation in special projects.

Programs and activities include advisement of campus organizations, registration of student organizations, planning and coordination of major campus events, and oversight of Greek Affairs, Colonial Inauguration, the Presidential Administrative Fellows Program, band and cheerleading, and intramural and club sports. Additional information about the services offered by the Student Activities Center, and about the various student organizations and committees, can be obtained from the *Student Planner and Handbook*.

Program Board—The Program Board, composed chiefly of elected and appointed students, has the primary responsibility of allocating resources for student programming on campus. In addition, the Program Board provides funding for activities presented by various campus organizations and encourages student participation in program planning through involvement in committees on the arts, concerts, festivals, films, parties, political affairs, and public relations.

Student Government— The George Washington University Student Association, made up of all full-time and part-time undergraduate and graduate students who are registered for academic credit on campus. A body of elected and appointed individuals is responsible for representing the interests of students at

the University. The Student Association provides various services for students, such as academic evaluations, test and syllabus files, and the Student Advocate Service.

Student involvement in the governance of the University is also possible through participation in various administrative and Faculty Senate committees, advisory councils of the schools and college, selected committees of the Board of Trustees, and specialized bodies, such as the Residence Hall Association, the Joint Food Services Board, and the Marvin Center Governing Board. This involvement has helped develop policies and programs beneficial to students and to the University community as a whole.

Student Organizations—Students are encouraged to become involved with existing student organizations or to initiate their own. There are approximately 270 registered organizations on campus, covering a broad spectrum of interests, including academic, professional, international, cultural, political, service, sports, hobbies, recreational, religious, and meditative groups as well as social fraternities and sororities.

Major Program Events

Art Exhibits—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Auditorium and in the Colonnade art gallery of the Marvin Center. Student art exhibits are presented each semester.

Concert Series—The Department of Music presents a series of concerts featuring faculty, guest, and student artists throughout the year. Other concerts are held regularly in the Marvin Center, Lisner Auditorium, and the Smith Center.

Dance—The GW Dance Company presents major concerts, informal studio performances, experimental events, television appearances, and lecture–demonstrations. Students may audition to become company members and have the opportunity to choreograph, perform, and gain experience in the technical aspects of dance productions.

Glee Club, Jazz Band, and Orchestra—The University Glee Club, Jazz Band, and Orchestra are available to students as either credit courses or cocurricular activities. All of these organizations present major performances to the University community several times a year, including regular winter and spring concerts.

International Programs—The International Student Society presents an annual international dinner in cooperation with foreign embassies and international restaurants. Other programs include regular forums and speakers on international topics.

Program Board—The University Program Board, through its various committees and in cooperation with other campus groups, regularly sponsors films, lectures, concerts, social activities, and special events.

Theatre—The University Theatre produces four or five major plays and musicals during the year on the proscenium thrust stage in the Dorothy Betts Marvin Theatre. Additional works, including original and experimental plays, are produced in a more intimate studio theatre.

Athletics, Recreation, and Intramurals

The Charles E. Smith Center offers many facilities for student use, including courts for basketball, volleyball, and badminton; a jogging track, a swimming pool; gymnastics and weight rooms, racquetball and squash courts; a sauna; and [illegible] ers. In addition, the Student Activities Center offers a broad program of intramural and recreational activities held in the Smith Center and designed to accommodate various levels of skill, experience, and interest.

Medical Center Facilities

Walter G. Ross Hall

Walter G. Ross Hall, opened in 1973, houses the teaching and laboratory facilities for students in the School of Medicine and Health Sciences. It occupies a city block on the northwest edge of the University campus.

Educational Support Services

A group of core facilities and services supports the educational, clinical, and research programs of the Medical Center. Coordinated under the Office of Academic Affairs, these services include the following:

Office of Educational Resources (Shelley A. Bader, M.L.S., Ed.D., Associate Vice President)— This office guides the development of all centrally coordinated academic information services, educational support services, and learning resources. Major departments include the Himmelfarb Health Sciences Library, Biomedical Communications, and the Distance Education Services office.

The library's collection includes nearly 25,000 monographs and 1,400 active journals. The library maintains an extensive audiovisual study center and microcomputer laboratory including video programs, computer aided instruction, software, and interactive media for all components of the curriculum. Numerous databases, including MEDLINE and HEALTH, are available as well as electronic mail and Internet access.

Biomedical Communications supports the professional activities of Medical Center faculty, staff, and students requiring photographic, illustrative, graphic, and print media.

The Distance Education Services Office was created to facilitate access to educational support services, manage educational technology resources, and answer technology questions for students enrolled in distance learning programs. In addition, the office assists faculty with technology integration and works to facilitate interaction among students and faculty.

Office of Information Technology (Joel M. Schectman, M.D., Chief Information Officer)—This office offers computer assistance in such areas as test scoring, evaluation of student feedback, course registration, continuing medical education credit reporting, conference management, and automation of library procedures and inventories. The office also supports small databases for research projects that require interactive data maintenance or use forms that can be optically scanned, and it can transmit data to the University Computer Center for more sophisticated processing.

Office of Education (Rhonda M. Goldberg, M.A., Director)—The Office of Education works with faculty and students to improve the educational environment, conducts evaluations of courses and curricula and works toward the establishment of effective systems for evaluating student performance.

The George Washington University Hospital

The George Washington University Hospital, adjacent to the School of Medicine and Health Sciences, is an acute-care facility licensed to operate 501 beds. The hospital serves as the primary teaching site for students in the School of Medicine and Health Sciences and for more than 400 physicians participating in its accredited postgraduate training programs offered by the Medical Center. The hospital records more than 17,000 patient admissions each year and provides a broad range of tertiary care services to an equally broad-based patient population.

The Medical Faculty Associates (MFA) is the multi-specialty group practice of faculty of the School of Medicine and Health Sciences, comprised of approx-

imately 280 physicians who are full-time members of the teaching faculty and others who have part-time appointments. They represent the full range of medical specialties, including hospital-based practices such as anesthesiology and emergency medicine, with subspecialists in all major fields except pediatrics. Primary care physicians practice and teach general internal medicine, pediatrics, family practice, and geriatrics.

The Ambulatory Care Center, which logs more than 35,000 patient visits per year, is the primary ambulatory teaching site for the School of Medicine and Health Sciences and for the graduate medical education programs. Most of the out-patient care is provided in private, office-type settings; some primary care is delivered by multi-disciplinary teams. The MFA also staffs a growing number of satellite facilities, both single-specialty and multi-specialty, that provide sites for teaching and clinical care within the Washington suburbs.

The George Washington University Health Plan (GWUHP), a health maintenance organization, opened in 1972 to provide patient care and to provide students and house staff with educational experience in a prepaid health plan setting. The GWUHP has more than 80,000 subscribers.

Primary Affiliated Hospitals and Research Centers

Children's National Medical Center—Children's is the site for the School's Department of Pediatrics and offers a comprehensive clerkship experience for third-year students and a variety of elective opportunities in the fourth year. The hospital provides primary and tertiary care to children in the greater Washington area and is a referral center for children throughout the world.

Fairfax Hospital—This voluntary community teaching hospital, part of a four-hospital system, serves a burgeoning suburban area and provides all clinical services, including psychiatry. Fairfax Hospital offers a rotating internship program, a school of medical technology, and clinical facilities for a school of practical nursing. Students of the School of Medicine and Health Sciences serve at this hospital in clinical clerkship and elective programs. Fairfax Hospital is an affiliated hospital for residency training in obstetrics and gynecology in the George Washington University Medical Center Program.

The Jerome H. Holland Laboratory—One of the nation's premier research centers in biomedical science, the Jerome Holland Laboratory (the research and development division of the American Red Cross), formally affiliated with the George Washington University School of Medicine and Health Sciences in 1994. A number of Holland Laboratory scientists have been appointed as faculty members at GW and are involved with the University's recently established Institute for Biomedical Sciences.

Holy Cross Hospital—Holy Cross is a primary clinical campus that provides students with firsthand exposure to the practice of medicine in the community. It is a private, voluntary facility that provides a full range of medical, surgical, and pediatric services for a growing suburban population. The hospital has consistently had one of the highest occupancy rates in the metropolitan area.

Veterans Administration Medical Center—This medical center has medicine, surgery, neurology, and psychiatry bed services. Other clinical services include radiology, nuclear medicine, laboratory (pathology), rehabilitation medicine, and radiation therapy. A nursing home has recently been opened. At any time, 140 residents and nearly 100 medical students are receiving training at the VAMC, under the supervision of 120 full-time staff physicians and a number of part-time staff physicians, consultants, and attending physicians. Specialized care programs include drug and alcohol rehabilitation, open-heart surgery, radiation therapy, and an extensive dialysis program.

Washington Hospital Center—This private, not-for-profit institution serves the greater Washington area through patient care, teaching, and research. A 74-bed intensive care tower supports the trauma and medical services, the cardiology and open-heart surgery programs, and the area's only adult burn service. The center offers approved postgraduate programs in all specialties except psychiatry and pediatrics for 205 residents and fellows. In addition, clinical rotations or teaching programs are provided for nurses, medical technologists, and other health sciences professionals.

Institutes

Research at The George Washington University School of Medicine and Health Sciences is carried out through the following institutes:

Institute for Biomedical Sciences (S. Ladisch)
Institute for Clinical Research and Clinical Trials (J. Rios)
Institute for Health Policy, Outcomes, and Human Values (G. Pawlson)

Medical Center Faculty Senate Standing Committees 1997–98

Academic Freedom and Ethics, M. McGrath, Chair
Admissions and Advanced Standing, L. d'Angelo, Chair
Appointments, Promotions, and Tenure, R. Rosenthal, Chair
Continuing Medical Education, J. Smith, Chair
Education Council, D. Karcher, Chair
Educational Evaluation, R. Walsh, Chair
Elections, V. Barnebey, Chair
Health Sciences Graduate Student Evaluation, L. Gallo, Chair
Health Sciences Programs, J. Voss, Chair
Public Relations, M. Sidawy, Chair
Research, A. Kumar, Chair

Alumni Associations

General Alumni Association

The objectives of this association are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes and to promote the general welfare of the University.

Membership in the association is conveyed automatically to anyone who has been graduated from any school or division of the University. Anyone who has earned credit hours or the equivalent at the University, who has left the University in good standing, and whose class has graduated is eligible for membership.

A Board of Directors, composed of members representing the constituent alumni of the University's schools and colleges, directs the activities of the association. The voluntary leadership of the association works closely with the staff of the Office of Alumni Relations in carrying out association affairs. The association can be contacted through the Office of Alumni Relations.

Medical Alumni Association

The GW Medical Alumni Association and the Medical Alumni Office are dedicated to strengthening the positive reciprocal relationship between the School of Medicine and Health Sciences and its alumni by offering graduates tangible opportunities to be involved in the life and support of the School. A key part of this mission is to communicate the achievements and concerns of the alumni to the School and to each other, and the accomplishments, aspirations, and needs of the School and its students to the alumni. Medical students are actively involved in the governance of the association and their representatives serve on the Council

Central to the association's goals are programs that support students. In addition to the Medical Alumni Annual Fund, which raises money for student assistance, these include the Catherine Breen Emergency Loan Fund, the Alumni Bed & Breakfast Program for students traveling to residency interviews and professional meetings, and the Physicians Courtesy Program. Programs for alumni include the annual Medical Center Days and the Class Reunion Program. An active recognition program is in place, including extensive coverage of alumni news in *GW Medicine*.

Membership in the association includes the M.D. graduates of the School, Doctors of Medicine who have completed postgraduate training in The George Washington University Hospital, and all current medical students. The Medical Alumni Association and GW Medical Alumni Office are located at 2121 K Street, N.W., Suite 200, Washington, D.C. 20037.

The Doctor of Medicine Degree Program

Admission

The George Washington University School of Medicine and Health Sciences seeks to admit intellectually gifted, empathetic, and mature students who have the capacity to excel in the science and art of medicine. Updated information on admission requirements, the application process, the program, and the curriculum is provided in a brochure available from the School's Office of Admissions. Applicants are encouraged to review this document carefully. Information is also available on the Internet at www.gwu.edu/~gwumc/edu/admis/index.htm. The Office of Admissions can be reached via e-mail at medadmit@gwis2.circ.gwu.edu.

Admission Requirements

To be considered for admission to the Doctor of Medicine (M.D.) degree program, applicants must have successfully completed a minimum of 90 credit hours at an accredited U.S. or Canadian institution of higher education. Professional school credit may be applied toward fulfillment of this minimum requirement only if the credit has already been accepted by the applicant's college or university toward a bachelor's degree. (Under the quarter system, a credit is two-thirds of a credit hour.) In most instances, applicants should complete four full years of undergraduate study; only exceptional applicants are accepted upon completion of the minimum requirements.

An early selection program enables George Washington University undergraduates to apply to the medical school at the end of the sophomore year. Those students accepted create a broad and vigorous program tailored to promote intellectual growth during their last two years in college. After graduation, they enter the M.D. program. Applications and letters of evaluation are due in mid-May. Contact the Office of Admissions for more detailed information.

The following course work must be completed with satisfactory achievement before the applicant can be certified for matriculation. All required science courses must include sufficient laboratory work to ensure familiarity with the experimental methods and techniques of the disciplines.

Biology—eight credit hours, including two credit hours of laboratory, in general biology or zoology, but *not* in botany.

Chemistry—eight credit hours of general inorganic chemistry (which may include qualitative analysis), including two credit hours of laboratory, and eight credit hours of organic chemistry, including two credit hours of laboratory.

Physics—eight credit hours, including at least two credit hours of laboratory.

English—six credit hours in composition and literature, which may be the standard introductory college courses or their equivalents.

The number of required courses has been kept to a minimum to enable college students to pursue their own interests in depth. The admissions committee has no preference with regard to the applicant's major area of study. Applicants with majors in the arts, humanities, and social sciences are as admissible as applicants with science majors. The committee does expect, however, that work in the student's chosen area of concentration as well as in the required science courses will reflect scholarly interests and show evidence of significant achievement.

Applicants must submit scores on the Medical College Admission Test (MCAT). MCAT scores will be valid only if the test was taken within three years of the date of expected matriculation.

Application Procedure

For Admission to the First Year Class—The School participates in the American Medical College Application Service (AMCAS). Applications for a place in the first-

year class can be obtained only from AMCAS, 2501 M Street, N.W., Washington, D.C. 20037. When completed, this application is returned to AMCAS for distribution to schools selected by the applicant. The AMCAS application deadline is December 1 of the year preceding that for which admission is sought.

When it receives the AMCAS application, the Office of Admissions will send the applicant a supplemental application requesting information not included on the AMCAS application. The supplemental application and letters of recommendation must be returned with the nonrefundable supplemental application fee ($75) no later than January 1. The admissions committee will then invite the most promising candidates to come for personal interviews. Applicants will be informed of the committee's final decision as soon after the interviews as possible. Although it does not assume an obligation to report missing or erroneous credentials, the admissions office will try to contact the applicant if it is noted that necessary credentials are missing.

The School also participates in the AMCAS Early Decision Program. Interested applicants should read the AMCAS information booklet included with the AMCAS application materials. Early decision applicants should be aware that (1) they must submit their applications by August 1 of the year preceding that for which admission is sought, and (2) their supplemental applications and all letters of recommendation and transcripts must be received by the Office of Admissions no later than September 1. Decisions on these applications are usually made by October 1.

Applicants should refer to the AMCAS information booklet and to the admissions brochure available from the School of Medicine and Health Sciences Office of Admissions for the most up-to-date information available at the time of application. Details included in those sources supersede information contained in this *Bulletin*.

All applicants are reminded that the submission of false or misleading information on application forms or in connection with the application process will be grounds for rejection. If such submission is discovered after entrance into the School or award of a degree, it will be grounds for dismissal or for revocation of the degree.

For Admission With Advanced Standing—Information and applications for admission with advanced standing should be obtained from the Office of Admissions (M.D. Program), School of Medicine and Health Sciences, 2300 I Street, N.W., Washington, D.C. 20037.

Applications may be submitted for either the second or third year. Applicants for advanced standing must meet all requirements for admission to the first and second year of study in the School of Medicine and Health Sciences (see Admission Requirements).

All applicants must submit the advanced standing application and the application fee by May 1, along with three letters of recommendation. If accepted, *official transcripts will be required*. The admissions committee will request an interview with selected students. Detailed information and guidelines may be obtained from the Office of Admissions in January of the intended year of transfer.

Selection Procedures

To process first-year applications fairly and expeditiously, the School uses an evaluation procedure that screens applicants on the basis of undergraduate grades (taking into account improvement in performance in later years), MCAT scores, graduate course work, pertinent extracurricular activities, work experience, research, and volunteer activities. Some additional consideration is given to applicants from the Washington metropolitan area and to applicants from George Washington University. There are no age limits.

Following this initial screening, the Admissions Committee then invites about 1,000 applicants for personal interviews.

When all credentials and interview reports are available, the application is reviewed by the admissions committee. Although grades and MCAT scores are considered, the committee relies heavily on the essay portions of the applications, letters of evaluation, and interview reports in assessing those motivational and personal characteristics it feels are important in future physicians.

Applicants who are offered a place in the class are required, within two weeks, to notify the Office of Admissions (M.D. Program), School of Medicine and Health Sciences, in writing, of their intent to accept the place reserved. A deposit ($100) used to reserve a student's place in the class is due after May 1. In addition, a tuition prepayment ($2,900) is required by July 1 and is credited toward the first semester's tuition.

Program of Study

The curriculum leading to the Doctor of Medicine degree is designed to provide a medical education that prepares graduates comprehensively for residency training, provides them the experience on which to base their career selection, and prepares them for professional lives of continuous learning.

The Practice of Medicine, a course that spans all four years, provides early patient exposure and the means to develop outstanding clinical thinking, technical skills, and a sense of professionalism. In the first two years, The Practice of Medicine offers a clinical apprenticeship, in which each student is placed with a practicing primary care clinician one day every other week; on alternate weeks, students meet in small groups with faculty mentors to learn clinical assessment skills and to consider ethical, social, and professional issues. In addition, problem-based learning is conducted through small-group, case-based tutorials.

The balance of the curriculum in Years I and II is devoted to didactic basic science instruction. In Year I, that instruction is concentrated on the study of normal human biology and function, with specific courses in cells and tissues, gross and microscopic anatomy, biochemistry, physiology, neurobiology, and immunology. In Year II, instruction is focused on the study of abnormal human biology, with specific courses in pathology, pharmacology, and microbiology. Year II concludes with Introduction to Clinical Medicine, an interdisciplinary course organized in terms of organ systems.

During the final two years, the M.D. program consists primarily in a series of required clerkships and elective sequences designed to prepare students for graduate training in any field of their choice, while at the same time providing them with extensive exposure to a variety of fields sufficient to enable them to make appropriate career decisions. Basic science content is reexamined and reinforced in the continuing Practice of Medicine course where, among other multidisciplinary considerations, the implications and applications of the basic sciences to the understanding and management of clinical problems are explored and topics of diagnosis and patient management are handled on a more sophisticated level.

Third year required clerkships of 8 to 12 weeks each include medicine, surgery, pediatrics, obstetrics and gynecology, psychiatry, primary care, anesthesiology, and emergency medicine. In the fourth year, students are required to complete a year-long internship in medicine, pediatrics, or family medicine, at least one course in basic science, emergency medicine, anesthesiology, and a non-clinical subject, 24 weeks of electives, four weeks of which must be in surgical subspecialties. A variety of elective experiences is available to meet these requirements at the University and its affiliated hospitals; permission may also be granted to take a limited number of electives elsewhere.

Honors

Students will be graduated "with distinction" if they have received no failing or incomplete grades during the four-year program leading to the Doctor of Medi-

cine degree and either (1) have received Honors grades in at least 50 percent of the total credit hours earned in required courses during the first three years or (2) have received Honors grades in more than 45 percent of the total credit hours earned in required courses during the first three years and have been recommended by a faculty committee on the basis of a strong fourth-year performance.

Joint Degree Programs

Integrated Bachelor of Arts/Doctor of Medicine

The University offers a seven-year integrated B.A./M.D. program. The program has been designed for honors students of high ability and maturity who have decided before applying to college, that they wish to become physicians and want to accomplish that goal in a shorter amount of time and at a lower overall cost than is usual. Detailed information on this program is available through the GW Undergraduate Admissions Office.

Integrated Engineering and Medicine Program

The Integrated Engineering and Medicine Program is offered to highly qualified high school students interested in pursuing a degree program in the School of Engineering and Applied Science, followed by an M.D. degree. This is an eight-year program, with progress reviewed each semester. Detailed information on this new program is available through the GW Undergraduate Admissions Office and the admissions office in the School of Engineering and Applied Science.

Joint Doctor of Medicine and Doctor of Philosophy

In cooperation with Columbian School of Arts and Sciences, a dual program is available to qualified students who seek both the Doctor of Medicine and Doctor of Philosophy degrees. The requirements that must be fulfilled for both degrees are identical to those currently and separately established in the School of Medicine and Health Sciences and Columbian School of Arts and Sciences.

To enter the joint degree program, a prospective student must apply for and gain admission to both Columbian School of Arts and Sciences and the School of Medicine and Health Sciences. If admitted to both schools, the student may apply for affiliation with the joint degree program. Work toward the Ph.D. is performed under the jurisdiction of a departmental doctoral committee and is available in more than 50 research fields.

A student working toward these degrees may apply a maximum of 24 credit hours of approved work taken in the M.D. program toward the minimum of 48 hours of course work required to qualify for the General or Cumulative Examination for Ph.D. candidacy. This course work is normally taken during the semesters that alternate with the medical program and in the years following the awarding of the M.D. degree. The student's research for the dissertation may begin concurrently with the final 24 credit hours of graduate course work leading to the General or Cumulative Examination. The estimated time for completion of this joint program is six years.

Details of the requirements for the Doctor of Philosophy degree are included in the *Graduate Programs Bulletin* of the University, available from Columbian School of Arts and Sciences, George Washington University, Washington, D.C. 20052.

Joint Doctor of Medicine and Master of Public Health

Students who wish to pursue the Master of Public Health degree in conjunction with the Doctor of Medicine degree must apply separately to each program. Those admitted must fulfill all requirements for each degree, although a limited amount of credit may be applied toward both degrees with the approval of the dean for academic affairs. By taking M.P.H. courses during the summer and

elective periods, medical students should be able to complete both degree programs in time to enter residency training on the usual schedule. For specific requirements of the M.P.H. program, contact the School of Public Health and Health Services.

Doctor of Medicine Special Programs

A special division has been created to allow flexibility in the pace at which selected students may proceed toward the M.D. degree. In most U.S. medical schools, including GW, students are required to take a full load of courses each semester or quarter. The Doctor of Medicine Special Programs offer the opportunity to take courses at a decelerated pace. At the present time, it is not a division to which students may apply directly. Access is offered by administrative action, on advice of the Admissions Committee, or in some cases, following faculty review of academic performance.

Decelerated Program

The Decelerated Program enables selected students to spread the highly compressed work of the first year of the M.D. program over two years. Applicants are invited to enter this program if, in the view of the Admissions Committee, they show great promise but present cause for concern because of weaknesses or aberrances in academic preparation. Typical examples would be an applicant with relatively low or inconsistent grades or MCAT, or a long period intervening between completion of undergraduate work and application to medical school. If in the view of the Admissions Committee there is a reasonable expectation that the student's preparation for the remainder of the program would be strengthened by deceleration in the first-year program, the student may be invited into the program. Courses are taken with students in the four-year program. To continue beyond the first year, five-year program students must achieve grades not lower than one standard deviation below the mean for all medical students in each course of more than two credits. (This is usually higher than the minimum level of performance required for a grade of "Pass.")

Remedial Program

Students who have experienced academic difficulties that cannot be addressed during the summer, or that require repetition of one or more major courses during the following academic year, may be assigned to the Doctor of Medicine Special Programs to take those particular courses. This occurs by administrative action following faculty review, and enables students to retake courses without paying full tuition (see below).

Tuition—Tuition in the Doctor of Medicine Special Programs is based on the number of credit hours taken. The fee per credit hour is derived by dividing the annual tuition for M.D. candidates by the number of credit hours regularly taken by students in that year. Thus, for students in the Five-Year Program, the tuition for first-year courses is divided over two years. Following successful completion of the decelerated first year, students enter the second-year program under the regulations for all four-year students.

Regulations for M.D. Candidates

Applicable

Students enrolled in the M.D. program are required to conform to, and are entitled to the benefits of, the *Guide to Student Rights and Responsibilities* (hereinafter referred to as the *Guide*), as well as all other rules, regulations, and policies with University-wide applicability. However, because of the unique curriculum and degree requirements of the School of Medicine and Health Sciences, the University Board

of Trustees has established the following Regulations for M.D. Candidates (hereinafter "Regulations"). Certain procedures in these Regulations are designed to supplement policies established by the Guide. For instance, the process set forth in Section 7 of Article B of these Regulations is designed to provide protection against improper academic evaluation as guaranteed by Article II, Section B of the Guide (Protection Against Improper Academic Evaluation). Other procedures in these Regulations are meant to replace procedures set forth in the Guide in most instances. For example, all cases involving alleged misconduct by M.D. candidates will be processed under these Regulations, unless the School of Medicine and Health Sciences dean or his/her designee (hereinafter "dean") decides in a particular case to have the case processed under the Guide's Code of Student Conduct. In the case of any inconsistency or ambiguity between these Regulations and University-wide rules, regulations, and policies, including the Guide, these Regulations shall govern.

A. General

1. The minimum requirement for the M.D. degree will be the completion of all courses designated by the School's Faculty Senate to be required, and a passing grade in all courses taken, whether required or not, other than electives in the first and second years. (Minimum requirements for M.D. candidates in the Doctor of Medicine Special Programs are different, and such students are referred to Article I of these Regulations for a statement regarding modified minimum requirements.)
2. Using the guidelines below, the Education Council will periodically determine and report to the School's Faculty Senate on the appropriate number of credits for all courses.

   First- and Second-Year Courses

   a. One credit hour for each hour of lecture time per week per semester, adjusted as appropriate.
   b. One credit hour for each two or three hours of laboratory and/or small-group teaching time per week per semester, adjusted if appropriate.

   Third- and Fourth-Year Courses

   c. Five credit hours for each four-week experience; three credit hours for each two-week experience.

B. Evaluation of Academic Performance

1. The faculty is responsible for evaluating the performance of students in a meaningful, useful, and timely manner. The authority for assignment of grades rests with academic departments or with faculty of interdisciplinary courses. Exceptions are the notations of Incomplete and Withdrawal (see below), which require the concurrence of the dean.
2. Departments are responsible for the assignment of grades on a basis that is rational, just, and unbiased.
3. The grading system for all nonrequired electives will be:

   Pass (P) Fail (F)

   For all required courses and senior electives, the grading system will be:

   Honors (H) In Progress (IPG)
   Pass (P) Incomplete (I)
   Conditional (CN) Withdrawal (W)
   Fail (F) Exempt (EX)

4. The following definitions apply:

   Honors (H)—Those students whose performance in a subject is determined by the responsible department to be of superior quality may be assigned the grade of Honors (H).

Pass (P)—All students, with the exception of those defined above, whose performance in a subject meets the requirements established by the responsible department shall be assigned a grade of Pass (P).

Conditional (CN)—Those students who do not meet the minimum requirements established by the responsible department, but who could reasonably be expected to do so through a limited program of remedial work, may be assigned the grade of Conditional (CN).

Fail (F)—Those students whose performance in a subject clearly falls so far below departmental passing standards that limited remedial work would be inadequate to correct the deficiencies shall be given a grade of Fail (F).

In Progress (IPG)—The notation of IPG will be assigned to students in courses that require more than one semester for completion. A grade will be assigned upon completion of the entire course in a subsequent semester.

Incomplete (I)—The notation of I will be assigned by the faculty member or department when a student fails to complete all the required work in a course. Assignment of an Incomplete requires the concurrence of the dean on a case-by-case basis. A student in the first or second year may not proceed in the work of the following year until a grade of I has been converted. a student in the third or fourth year must remove a grade of I prior to graduation. If not converted to a Pass, a grade of I will be changed automatically to a grade of F within one year.

Withdrawal (W)—The notation of W will be assigned only when a student is unable to continue in the course for reasons acceptable to the dean. Such reasons may not include poor scholarship.

Exempt (EX)—The notation of EX will be assigned when a student proves competent in a subject and is excused by the responsible department, or when a student is given credit for passing an equivalent course in another institution acceptable to the department and the dean.

5 All departments must submit F and CN grades to the Office of the Dean as soon as possible after the student has completed a course or clerkship.

A definition of work required to convert an F or CN shall be developed by the department, reviewed by the Committee on Educational Evaluation otherwise known as the Educational Evaluation Committee, or EEC), and approved by the dean. Any F or CN grades must be converted at a minimum to a Pass grade. A grade of F requires that the student repeat the course or complete an equivalent remedial experience. A grade of CN may be converted by a program of more limited work, as developed by the responsible department and approved by the EEC.

No student may proceed from the first to the second year or from the second to the third year of the M.D. program without having first upgraded all grades of F and CN. Students with failing or conditional performances in third-year clerkships may remedy those deficiencies during the fourth year with the approval of the dean. Conditional or failing grades in fourth-year courses shall be remedied in the fourth year prior to receiving the M.D. degree.

Performances upgraded from the conditional to the passing level will be graded as CN, P. A student may elect to repeat the course, provided it is being offered, rather than undertake a limited remedial program to convert a Conditional grade. In that case, the initial grade remains CN and the repeated course is listed and graded separately.

Failure to convert a CN within the period as proscribed by the dean shall result in automatic conversion of a CN to CN, F.

The dean will inform the EEC of the names of all students receiving grades of F or CN and submit their records to the Committee for evaluation and recommendations.

7. Any student who considers a grade or evaluation to be unjust or inaccurate may, within 14 calendar days of receiving the grade, appeal in writing to the signer of the evaluation with a copy to the dean. The student is deemed to have received the grade three days after mailing of the official grade form. If the issue is not resolved to the student's satisfaction within 30 calendar days of receipt of the grade, the student may appeal it in writing to the chair of the responsible department, setting forth the reasons for reconsidering the grade or evaluation. The student shall send a copy of this written statement to the dean.

The chair shall conduct a review, consulting as appropriate with other faculty, staff, and the student, and convey a determination to the student in writing, with a copy to the dean. If the issue is not resolved to the student's satisfaction within 14 days of receipt of the appeal to the chair, and s/he wishes to appeal it further, s/he shall do so in writing to the dean. In considering the student's appeal, the dean is limited to determining whether or not the evaluational or grading procedures used were essentially the same as those used for other students in that course and, *independent of that conclusion*, whether or not there is sufficient evidence of an unjust or erroneous evaluation. In carrying out this task, the dean may, at his/her sole discretion, seek advice from an ad hoc committee formed to review the complaint. There should be both student and faculty representation on such a committee, but no member may be from the department in question.

Should the dean find that the grade or evaluation is unjust or inaccurate s/he will, in consultation with the chair of the department, determine an appropriate reevaluation procedure and/or grade for the student. The decision of the dean is final.

Failure of the student to comply with these procedures, including the stated time limits, indicates acceptance of the grade.

C. **Academic Dismissal**

1. A student is at risk for academic dismissal under the following conditions:
   a. The student receives grades of CN and/or F in two or more required courses in the first semester of Year I;
   b. The student receives grades of F in two or more required courses (or senior electives) of greater than 3 credits in any academic year;
   c. The student receives grades of CN and/or F in three or more required courses (or senior electives) in any academic year;
   d. The student receives a grade of F in one or more required courses (or senior electives) totaling 12 or more credit hours in any academic year or totaling 20 or more credit hours in the M.D. program;
   e. The student receives grades of CN and/or F in required courses (or senior electives) totaling 20 credit hours or more of work in any academic year, or totaling more than 30 credit hours in the M.D. program;
   f. The student receives a grade of CN or F in a required course or senior elective, when that student has previously been at risk for academic dismissal;
   g. The student receives a Fail grade on the USMLE Step I exam on three attempts; or
   h. The student fails to meet any special requirement(s) previously specified for that student by the dean for academic affairs as a condition for continuation in the M.D. program.
2. All conditional (CN) and failing (F) grades in required courses and senior electives contribute to risk for academic dismissal, including those that have been upgraded. A CN downgraded to CN/F shall count as an F in deter-

mining whether a student is at risk for academic failure. A failure in a course that was taken to remedy a grade of F in a required course will count as an additional F.

3. A student at risk for academic dismissal will receive notification from the dean that s/he is at risk. Notification will be made upon report of the grade that puts the student at risk for academic dismissal.

4. The EEC, in an advisory capacity to the dean, shall conduct a review of the student's academic record and any written statement the student may wish to submit to the dean in a timely fashion. The review shall include an opportunity for the Committee to meet with the student, since the meeting is not adversarial, neither the University nor the student shall have legal representation present. Thereafter, the EEC will meet in executive session and develop a recommendation to the dean. The written recommendation will be submitted to the dean, along with the written documentation reviewed by the EEC.

5. The dean will decide on a student's dismissal from, or continuation in, the M.D. program. The dean, at his/her sole discretion, may meet with the student prior to making a determination. The decision of the dean shall be in writing and will include the reasons for the decision.

6. The dean is not bound by the EEC recommendation. In the case of a student who is allowed to continue in the M.D. program, the dean may modify the academic program and or impose special conditions that may be continuing in nature. The decision of the dean is final.

D. **Irregular Progress**

1. Repetition of a Year

Upon advice of the EEC, the dean may require that a student in academic difficulty repeat a year, or s/he may permit a student at risk for dismissal to repeat a year. Requiring repetition of a year would be an option if there was a pattern of academic problems that would be difficult or impossible to remedy before the beginning of the next academic year. Permitting repetition of a year would be an option if the student was subject to dismissal on academic grounds but showed promise of mastering academic material on an additional attempt and of proceeding without further major difficulty toward becoming a competent physician. A student eligible for promotion may be allowed to repeat a year at his/her own request.

2. Leave of Absence

Leave of absence, including the conditions and timing of the return, may be granted at the discretion of the dean.

3. Withdrawal from the M.D. Program

In the event that a student who withdraws from the M.D. program subsequently changes his/her mind and wishes to re-enter the program, s/he must reapply through the admissions process, as would any other applicant for medical school.

E. **Evaluation of Professional Comportment**

Occasionally, a student's behavior, or pattern of behaviors, may raise concerns as to the student's suitability to continue in the study of medicine. The process described below is intended to deal with behaviors that may be unacceptable to the School of Medicine and Health Sciences or raise questions about the student's fitness for the practice of medicine.

1. When a problem with professional comportment (other than academic dishonesty) regarding a student is perceived, the observer will communicate this concern to the dean. If the communication is verbal, it must be confirmed immediately by a signed written statement or else it will not be pursued further.

2. Upon receiving such a communication, the dean will create a confidential file in which all documents pertaining to the matter will be placed. The contents of the file will be preserved for a period of time not less than five years from the date of separation or graduation from the School of Medicine and Health Sciences. Access to this file will be restricted to the student under consideration; the dean and the dean's staff; the EEC; the Subcommittee on Professional Comportment of the EEC, if one is constituted; and attorneys for the University and student.
3. The dean will notify the student in writing that a communication has been received from someone who perceives that the student has a problem with professional comportment. The notice will include a copy of these Regulations.
4. The dean will meet informally with the student as soon as possible. At that meeting, or as soon thereafter as possible, the dean may do one or more of the following:
   a. Advise the student.
   b. Recommend that the student seek professional assistance, at the student's expense.
   c. Develop additional information through contacts with the student, his/her peers, faculty, professional consultants, and/or any other source deemed to have relevant information. With the student's concurrence s/he may be referred for a medical, psychiatric, and/or psychological evaluation. The cost of such an evaluation will be paid by the University, and the student will be asked to authorize the professional consultant to make a written report to the dean for inclusion in the student's confidential file. This authorization of the release of information regarding a psychiatric or psychological evaluation shall be made only after the student has had a chance to review the written report.
   d. Refer the case to a Subcommittee on Professional Comportment.
   e. Suspend the student pending investigation and recommendation of the Subcommittee on Professional Comportment and/or the EEC.
5. The involvement of, and actions taken by, the dean may be continuing in nature.

Paragraphs 6 through 19 apply if the student is referred to a Subcommittee on Professional Comportment.

6. A Subcommittee on Professional Comportment and its chair will be named by the chair of the EEC. The Subcommittee will consist of two students from the third and/or fourth year of the M.D. Program and two faculty, at least one of whom shall be a member of the EEC.
7. The dean will notify the student in writing of the composition of the subcommittee. The student will be allowed ten calendar days from the mailing of this notice to object to any person's appointment to the Subcommittee. Such objection must be sent to the dean in writing. The dean will, at his/her sole discretion, determine whether an objection warrants the appointment of one or more different persons to the Subcommittee, who shall be selected as set forth in paragraph 6.
8. The Subcommittee will investigate the allegation. The Subcommittee will review the student's confidential file and interview him or her. The subcommittee also may gather and review other material and interview any other person who the Subcommittee, at its sole discretion, has reason to believe may have relevant information to contribute. The Subcommittee, when it deems appropriate, may ask the dean to refer the student for a medical, psychiatric, or psychological evaluation so that the Subcommittee may consider information such an evaluation would reveal.
9. If the Subcommittee requests such an evaluation, the dean will make such referral. No student may be compelled to be evaluated; the cost will be

borne by the University and the student will be asked to authorize the professional consultant to make a written report to be included in the student's confidential file. This authorization of the release of information derived from the evaluation shall be made only after the student has had a chance to review the written report.

10. The student under review and/or the student's attorney or advisor may attend the information-gathering sessions. These sessions are not in the nature of an adversarial proceeding; the student and/or his or her attorney or advisor may submit questions to be answered by persons interviewed by the Subcommittee, but the procedure regarding their questioning is left to the sole discretion of the Subcommittee. The student may speak on his/her behalf and may submit other material. The legal rules of evidence, including, but not limited to, those rules regarding relevancy and hearsay, are not applicable. The student may suggest that the Subcommittee interview additional persons, but the decision to interview such persons is left to the sole discretion of the Subcommittee. The student and the student's attorney or advisor cannot be present when the Subcommittee meets in executive session.
11. Meetings of the Subcommittee are confidential. Minutes of the Subcommittee will be placed in the student's confidential file upon the completion of the Subcommittee's review.
12. The chair and all members shall be required to be present for all meetings of the Subcommittee.
13. The Subcommittee will make its final recommendation(s) to the dean. Such recommendation(s) will be in writing and shall include findings of fact and the reasons for the recommendation(s). The recommendation(s) could include, but is (are) not limited to, one or more of the following:
    a. Advising the student.
    b. Recommending that the student seek professional assistance, at the student's expense.
    c. Recommending conditions with which the student must comply in order to continue in the M.D. program.
    d. Recommending temporary suspension from the M.D. program.
    e. Recommending dismissal from the M.D. program.

    The Subcommittee shall make an additional recommendation regarding whether or not the confidential file will be made a part of the student's permanent academic file.
14. If the Subcommittee recommends suspension or dismissal from the M.D. program, or any modifications of the academic program, the matter will be referred to the EEC. The EEC will review the confidential file and the report of the Subcommittee. The chair of the Subcommittee will present the Subcommittee report to the EEC and will respond to inquiries from the EEC members. The student and/or his or her attorney or advisor may be present during the presentation of the Subcommittee chair and may submit a written statement to the EEC. The student and/or his or her attorney or advisor will not be able to question the Subcommittee chair or the EEC members, or present additional witnesses, and cannot be present when the EEC meets in executive session. The student may be interviewed by the EEC if the student attends the meeting, however, this meeting shall not be a *de novo* hearing of the matter. The EEC will either remand the matter back to the Subcommittee if additional information is required, or it shall submit its written recommendations, along with those of the Subcommittee, to the dean.

15. The dean will review the student's confidential file, the report of the Subcommittee, and the report of the EEC, if one has been produced. The dean, at his/her sole discretion, may meet with the student prior to making his/her determination.
16. The dean will take whatever action s/he deems appropriate, including dismissal of the student from the M.D. program. The dean will inform the student in writing of his/her decision.
17. The student shall have 15 calendar days in which to appeal the decision of the dean. Such appeal shall be in writing and sent to the vice president for health affairs. The scope of this appeal is for the vice president for health affairs to determine whether the procedures set forth in these Regulations have been complied with. Failure to appeal the decision shall be deemed a waiver of any and all rights to challenge the dean's decision, and shall be deemed an acceptance of the same.
18. The vice president for health affairs will make a decision on the written record of the proceedings. The vice president's decision shall be final.
19. At any time during the process, if the student in question is accompanied by an attorney, the University will have its attorney present. The student, therefore, is required to inform the Office of the Dean two days in advance of the hearing if counsel is to be present.

E. The Honor Code

1. Purpose

The objective of the Honor Code is to foster a sense of trust, responsibility, and professionalism among students and between students and faculty. Its fundamental goals are to promote ethical behavior, to ensure the integrity of the academic enterprise, and to develop in students a sense of responsibility to maintain the honor of the medical profession. This code of behavior is designed to assist in the personal and intellectual development of the medical student on the journey to becoming a physician and member of the medical community. All members of the medical community must be accountable to themselves and others.

2. Student Responsibilities

a. Students will not:
   (1) Give or receive aid during an examination
   (2) Give or receive unpermitted aid in assignments
   (3) Plagiarize any source in the preparation of academic papers or clinical presentations
   (4) Falsify any clinical report or experimental results
   (5) Infringe upon the rights of any other students to fair and equal access to educational materials.
   (6) Violate any other commonly understood principles of academic honesty
b. No code can explicitly enumerate all conceivable instances of prohibited conduct. In situations where the boundaries of proper conduct are unclear, the student has the responsibility to seek clarification from the appropriate Honor Code Council member(s), faculty member(s), or deans.
c. Each student has the responsibility to participate in the enforcement of this Code. Failure to take appropriate action is in itself a violation of the Code.
d. The student must agree to participate in the enforcement of this Honor Code and, prior to matriculation, must sign a statement agreeing to uphold its principles while enrolled at The George Washington University School of Medicine and Health Sciences.

3. Faculty Responsibilities

Each faculty member has the responsibility to participate in the enforcement, promotion, and clarification of the Honor Code. The faculty plays an integral role in the maintenance of the Honor Code. To this end, faculty will endeavor to:

a. Define the types of aid or collaboration permissible in course work.
b. Avoid procedures or ambiguities that may create undue temptation to violate the Honor Code.
c. Reinforce the tenets of the Honor Code.

4. The Honor Code Council

The Honor Code Council (hereinafter the "Council") shall consist of six faculty members and twelve students. Each year's class shall be represented by three students. These students shall be nominated by the Medical Center Student Council and approved by the dean. The faculty shall be selected by the chair of the Educational Evaluation Committee and approved by the dean. The chair of the Council, who shall be a member of the faculty, shall be appointed by the dean. To ensure continuity, faculty and chair terms of appointment will be three years and staggered, with the possibility of two contiguous terms of appointment. Students will be encouraged to re-elect their representative members.

Members of the Council shall serve as reference persons for students and faculty. Furthermore, the Council as a whole shall be charged with the continued monitoring of the Honor Code system. It will review all cases of alleged Honor Code violations that have been submitted to a Subcommittee on Professional Comportment in order to educate the academic community following the resolution of each case. It shall meet periodically during the academic year and report its findings to the FEC, including suggested amendments to the Honor Code. Members of the Council may serve on a Subcommittee on Professional Comportment convened as an Honor Code Committee to review an alleged violation of the Honor Code or to recommend sanctions in established cases of Honor Code violations.

6. Academic Dishonesty and Violations of the Honor Code

1. When a student, member of the faculty, or Medical Center staff member observes something that appears to be a violation of the Honor Code, that person will confront the individual(s) to receive an explanation and to gain satisfaction that there was no intention of breaching the Code. It is hoped that most events will be dealt with in this manner. If satisfaction is not gained the witness will take further action:
   a. consult with a member of the Honor Code Council regarding the witnesses' observation in order to determine whether a written report should be made, and or
   b. submit a written report of the alleged infraction to the dean.
2. When the dean receives such a report, s/he will create a confidential file in which all documents pertaining to the matter will be placed. The contents of the file will be preserved for a period of time not less than five years from the date of separation or graduation from the School of Medicine and Health Sciences. Access to this file will be restricted to the student under consideration, the dean and his/her staff, the FEC, the Council, the Subcommittee on Professional Comportment, if one is constituted, and attorneys for the University and student.
3. The dean will notify the student in writing that s/he has received a written report alleging a violation of the Honor Code. The notice will include a copy of the report and these Regulations for M.D. Candidates.

4. The dean will meet with the student as soon as possible. At that meeting or as soon thereafter as possible, the dean may do one or more of the following:
   a. If the witness filing the report, the student concerned, and the dean agree on the accuracy of the charges, the fact of this agreement shall be noted in writing by all three parties, and the case will be referred to a Subcommittee on Professional Comportment sitting as an Honor Code Sanctions Committee. The recommended sanctions will then be referred to the EEC for its consideration and action for modification of the student's academic program if necessary (see Section 11 of this Article G).
   b. If upon reviewing the charge and any supporting evidence, the dean believes that there is insufficient evidence of academic dishonesty to warrant further review, the dean may dismiss the charge without further investigation or review.
   c. If the student denies the accuracy of the charge, and the charge is not withdrawn or dismissed, the case will be referred to the EEC for review by a Subcommittee on Professional Comportment sitting as an Honor Code Committee.

   Paragraphs 5 through 15 apply if the student is referred to a Subcommittee on Professional Comportment. Paragraph 12 does not apply if the Professional Comportment Subcommittee is sitting as an Honor Code Sanctions Committee.
5. The Subcommittee on Professional Comportment and its chair will be named by the dean in consultation with the chair of the Honor Code Council. The Subcommittee will consist of at least two student members of the Honor Code Council and at least two faculty members of the Honor Code Council.
6. The dean will notify the student in writing of the composition of the Subcommittee. The student will be allowed five calendar days from the mailing of this notice to object to any person's appointment to the Subcommittee. Such objection must be sent to the dean in writing. The dean will, at his/her sole discretion, determine whether an objection warrants the appointment of one or more different persons to the Subcommittee, who shall be selected as set forth in paragraph 5.
7. The Subcommittee will investigate the alleged Honor Code violation. The Subcommittee will review the student's confidential file and provide the student with the opportunity to be interviewed. The Subcommittee also may gather and review other material and interview any other person who the Subcommittee, in its sole discretion, believes may have relevant information to contribute.
8. The student under review and/or the student's attorney or advisor may attend the information-gathering sessions. These sessions are not in the nature of an adversarial proceeding; the student and/or his or her attorney or advisor may submit questions to be answered by persons interviewed by the Subcommittee, but the procedure regarding their questioning is left to the sole discretion of the Subcommittee. The student may speak on his/her behalf and may submit other materials. The legal rules of evidence, including, but not limited to, those rules regarding relevancy and hearsay, are not applicable. The student may suggest that the Subcommittee interview additional persons, but the decision to interview such persons is left to the sole discretion of the Subcommittee. The student and the student's attorney or advisor cannot be present when the Subcommittee meets in executive session.

9. Meetings of the Subcommittee are confidential. Minutes of the Subcommittee will be placed in the student's confidential file upon the completion of the Subcommittee's review.
10. The chair and all members shall be required to be present for all meetings of the Subcommittee.
11. The Subcommittee will make its final recommendation(s) to the dean. Such recommendation(s) will be in writing and shall include findings of fact and the reasons for the recommendation(s). The recommendation(s) could include, but are not limited to, one or more of the following:
    a. Advising the student.
    b. Recommending that the student seek professional assistance, at the student's expense.
    c. Recommending conditions with which the student must comply in order to continue in the M.D. program.
    d. Recommending that the work product be discarded, which might result in an Incomplete, with the requirement that the student satisfactorily complete compensatory work, or be re-evaluated on relevant material.
    e. Recommending that a grade of F be awarded, with the remedy for the F being the repetition of the entire course (i.e., not the summer remedial), with a notation of "Failed the course for academic dishonesty" (or "violation of the Honor Code") appearing on the transcript, and with the notation to be expunged at the option of the EEC at a later date or upon graduation.
    f. Recommending that a grade of F be awarded, with the remedy for the F being the repetition of the entire course (i.e., not the summer remedial), with a notation of "Failed the course for academic dishonesty" (or "violation of the Honor Code") placed permanently on the transcript.
    g. Recommending temporary suspension from the M.D. program, with the notation of "Suspended for Academic Dishonesty" (or "violation of the Honor Code") placed permanently on the transcript.
    h. Recommending permanent dismissal from the M.D. program, with the notation of "Dismissed for Academic Dishonesty" (or "violation of the Honor Code") placed permanently on the transcript.

    The Subcommittee shall make an additional recommendation regarding whether or not the confidential file will be made a part of the student's permanent academic record.
12. Should the Subcommittee on Professional Comportment decide that no infraction of the Honor Code has occurred, there will be no further review.
13. If the Subcommittee recommends suspension or dismissal from the M.D. program, or any modifications of the academic program, the matter will be referred to the EEC. The EEC will review the confidential file and the report of the Subcommittee. The chair of the Subcommittee will present the Subcommittee report to the EEC and will respond to inquiries from the EEC members. The student and/or his or her attorney or advisor may be present during the presentation of the Subcommittee chair and may submit a written statement to the EEC. The student and/or his or her attorney or advisor will not be able to question the Subcommittee chair or the EEC members, or present additional witnesses, and cannot be present when the EEC meets in executive session. The student may be interviewed by the EEC if the student attends the meeting, however, this meeting shall not be a *de novo* hearing of the matter. The EEC will either remand the matter back to the Subcommittee if additional information is required, or it shall submit

its written recommendations, along with those of the Subcommittee, to the dean.

14. The dean will review the student's confidential file, the report of the Subcommittee, and the report of the EEC, if any. The dean, at his/her sole discretion, may meet with the student prior to making his/her determination.

15. Should the dean concur with the Subcommittee on Professional Comportment's conclusion that a violation of the Honor Code has occurred, one or more sanctions must be invoked by the dean. This may range from discarding the work product to dismissal of the student from the M.D. program, with an appropriate notation placed on the transcript.

16. The dean will take whatever action is deemed appropriate, including dismissal of the student from the M.D. program. The dean will inform the student in writing of his/her decision.

17. The student shall have 15 calendar days in which to appeal the decision of the dean. Such appeal shall be sent in writing to the vice president for health affairs. The scope of this appeal is for the vice president for health affairs to determine whether the procedures set forth in these Regulations have been complied with. Failure to appeal the decision shall be deemed a waiver of any and all rights to challenge the dean's decision and shall be deemed an acceptance of the same.

18. The vice president for health affairs will make his/her decision on the written record of the proceedings. His/her decision will be final.

19. At any time during the process, if the student in question is to be accompanied by an attorney, the University will have its attorney present. The student, therefore, is required to inform the Office of the Dean two days in advance of the hearing if counsel is to be present.

20. Should the review procedures not be completed before the date on which grades are submitted by the department, the notation Incomplete will be recorded for the student in that course until charges have been fully adjudicated.

21. If the student voluntarily withdraws from the institution prior to completion of the review process, the following notation will be placed on his or her transcript:

> "Withdrew following accusation of academic dishonesty (or Honor Code violation) and prior to complete review and determination."

H. Policy on Promotions and Graduation—Academic Requirements

1. In general, promotion from one year to the next for regular M.D. candidates—and recommendation to the School's Faculty Senate for award of the M.D. degree—will be automatic upon completion of academic requirements. As indicated in Section 1 of Article A of these Regulations, the minimum requirement for the M.D. degree will be the completion of all courses designated by the School's Faculty Senate to be required, and a passing grade in all courses taken, whether required or not, other than electives in the first and second years. When evaluation of professional comportment and or academic dishonesty is pending or completed under procedures described in Articles E and G of these Regulations, promotion and graduation may be postponed, denied, or subject to additional requirements set for individual students by the dean.

Additional requirements may be set for all students by the faculty and or the dean.

2. Specific Requirements

a. Year I to Year II. Successful completion of all required work of the first year with performance at least at the passing level. The student must

begin the work of the second year until all deficiencies of the first year have been satisfactorily remedied.

b. Year II to Year III: Successful completion of all required work of the second year, with performance at least at the passing level; and successful completion of the requirements set by the School's Faculty Senate as a prerequisite to entering the third year. At present these include receipt in the Office of the Dean of a passing score on Step I of the United States Medical Licensing Examination (USMLE) and certification of computer literacy by the Department of Computer Medicine. Additional requirements may be established and implemented by the EEC and Senate action alone. The student may not proceed with the work of the third year until all deficiencies in work of the second year have been satisfactorily remedied.

c. Year III to Year IV: Successful completion of all required clerkships of the third year with performance at least at the passing level. A student may be permitted to matriculate in the fourth year despite unremedied deficiencies in the third year performance; however, those deficiencies must be remedied prior to graduation during time that would otherwise be available to the student as elective time or vacation.

d. All students are required to take USMLE Step II and have a grade recorded prior to graduation.

3. Eligibility for Graduation

a. Students will be recommended to the Faculty Senate to be awarded the M.D. degree upon completion of the minimum academic requirements described in Section 1 of Article A of these Regulations and fulfillment of any additional conditions relating to professional comportment and/or academic dishonesty imposed by the dean pursuant to Articles E and G of these Regulations.

b. A candidate is required to be present at the commencement ceremony unless a written request for graduation in absentia is approved by the dean.

4. USMLE Policy

As of 1994, the United States Medical Licensing Examination (USMLE), comprising three steps, has become the sole examination pathway to licensure for physicians. The National Board of Medical Examiners (NBME) Part Examinations and the Federation Licensing Examination (FLEX) have been phased out. This major change in medical licensure procedures, plus the recognition that the majority of medical schools require passing the USMLE Step I (NBME Part I) exam as a separate requirement for promotion to clinical clerkships or for graduation, has led to a reconsideration of the role of the USMLE at The George Washington University School of Medicine and Health Sciences. Passing the USMLE Step I exam is essential to obtaining a license to practice medicine; and, while our graduates may not choose to practice, we believe passing these exams should ultimately be among criteria for graduation.

USMLE Step I: All students are required to take USMLE Step I in June of their second year. A Pass grade is required as a prerequisite to being promoted to the third year. Students who receive a *CN* and or *F* grade in one or more required courses of three or more credit hours may petition the dean to take the exam in October. Students who receive a Fail grade on Step I (June exam) are to complete the first clerkship of the third year (in July and August). The students are then withdrawn for the month of September and have the following two options:

Option A: To take and pass the next offering of Step I in October before resuming the third year in November. The students who choose this

option but who fail the exam for the second time (June and October) must take a leave of absence and retake the exam in June.

Option B: To take a leave of absence from school for the entire year and retake the exam the following June. The students who take this option and who fail the exam for the second time (June and the following June) must retake and pass the exam at its next administration in October.

Students who fail Step I three times are at risk for academic dismissal. Section C of the Regulations for M.D. Candidates will apply in this situation.

USMLE Step II. All students are required to take USMLE Step II and have a grade recorded prior to graduation. Although the requirement of a Pass grade on Step II prior to graduation would be consistent with the philosophy of the medical school, this requirement is presently impractical given the administration dates of the examination in relation to graduation.

I. Doctor of Medicine Special Programs

Within the School of Medicine and Health Sciences, a division exists to accommodate certain M.D. candidates in special situations. These include students who are not carrying a full academic load, but who are repeating courses during the academic year. Also included are students in a decelerated program that allows them to complete the work of the first two semesters across the span of two academic years. Other special programs may be developed for inclusion in this division. The Regulations for M.D. Candidates apply to all students in the Doctor of Medicine Special Programs, with the following exception for students in the decelerated program.

For all required courses of the first two years in the decelerated program—normally taken during the first two semesters of the regular four-year program—students are required to achieve better than a minimally passing performance as evidence of the likelihood of success when later carrying a full academic load. To be allowed to continue from one semester to the next, the student must achieve a grade in each course of three or more credit hours that is passing by departmental standards and that, in addition, is not more than one standard deviation below the mean for the whole class (being all those students in both the regular and decelerated program taking that course). Any student who fails to meet this standard may be dismissed summarily by action of the dean without review by the EEC.

Upon successful completion of the entire (traditional) first-year curriculum, students will be transferred into the regular M.D. program and will be graded as all other medical students. At that point, the exception regarding dismissal without review by the EEC no longer applies.

Financial Aid

All policies regarding student eligibility for financial assistance from institutional and government sources are available from the Financial Aid Office of the Medical Center. Assistance is awarded primarily on the basis of demonstrated financial need. In addition, recipients must be enrolled in regular attendance and making satisfactory academic progress in accordance with the Regulations for M.D. Candidates.

Information and application materials are available from the Financial Aid Office of the Medical Center, Ross Hall, Room 237, 2300 I Street, N.W., Washington, D.C. 20037. Students who wish to be considered for the loans and scholarships listed below must complete an application for financial assistance each year. The priority deadline for submission of financial aid applications is May 1 for returning students; there is no deadline for incoming students although students should submit their financial aid applications as soon as possible.

Satisfactory Academic Progress

The academic requirements of the M.D. program are rigorous, and the progress of each student is carefully monitored. Academic evaluations for each course, clerkship, or elective are based upon the achievement of the course objectives. Grades of Honors, Pass, Exempt, Incomplete, In Progress, Conditional, or Fail are given for each course. Students are not allowed to continue their course work at the School if they are not considered by the faculty to be capable of attaining the M.D. degree. Therefore, matriculated students who have not withdrawn or been dismissed are considered to be in good standing and making satisfactory academic progress.

As a rule, the M.D. program is completed in four years of full-time study. In some instances, however, the student may be required or permitted to repeat a year (see Irregular Progress, above). Students making irregular progress are nonetheless considered to be making satisfactory academic progress, even though the time taken to complete the degree may exceed four years. The specific standards of progress used in determining eligibility for financial aid are as follows.

1. Students who successfully complete required course work within the academic year and move on to the next year's set of requirements meet the satisfactory academic progress criterion for financial aid eligibility and have four consecutive academic years in which they may be eligible to receive financial aid. Students who are having academic difficulty but are able to complete necessary remediation before the beginning of the next academic year are also eligible to receive financial aid for four consecutive academic years.

2. Students may require additional time to complete course work due to academic or personal difficulties. In such situations, the Committee on Educational Evaluation and the associate dean for student affairs may establish a schedule for the student that departs from the norm and may require repeating a year of study. For such students, the maximum time frame for financial aid eligibility shall be seven (not consecutive) years.

3. Any period of time spent on approved leave of absence shall be excluded from the maximum established time frame. Students are ineligible for financial aid funds while on leave of absence.

4. Students who are registered through the University Office of Student Financial Assistance are not eligible for financial aid funds through the School of Medicine and Health Sciences. In these cases, the University Office of Student Financial Assistance determines financial aid eligibility.

The director of student financial assistance has primary responsibility for the enforcement of this policy. The director also ascertains if a student is maintaining satisfactory academic progress prior to the certification of financial aid applications and at the time of each disbursement of funds.

Documentation—Certification of the satisfactory academic progress of each student receiving financial assistance will be provided to the financial aid office by the associate dean. This certification is maintained in a permanent file.

Appeals—The dean will be responsible for hearing appeals regarding satisfactory academic progress. The financial aid office will accept the decisions of the dean.

Scholarships

Herbert and Ruth Abramson Scholarship Fund
Achievement Rewards for College Scientists (ARCS) Foundation, Inc., Scholarship
H. F. Andrews Scholarship Fund
Ida Bartsch Scholarship Fund
A. I. Bender Scholarship Fund

Adolphus B. Bennett Trust
Thompson H. Boyd Student Aid Fund
Everett Lamont Bradley Scholarship Fund
Catherine Breen Student Assistance Fund
Edith P. Brown Medical Scholarship Fund
Elma B. Carr Scholarship Fund
Agnes Neuser Chowe Scholarship Fund
Dr. Edith SeVille Coale Scholarships
Naomi and Nehemiah Cohen Foundation Scholarship Fund
Robert Keith Cole Endowed Scholarship
Joseph Collins Foundation Scholarships
Columbian Women Scholarship Funds*
  Estelle M. Corbett Scholarship Fund
  Jessie Fant Evans Scholarship Fund
  Lewes D. and Myrtle H. Wilson Memorial Scholarship Fund
Oliver C. Cox Scholarship Fund
Hilda E. Drake Foundation Scholarship Fund
Morris H. and Pauline L. Goldenberg Scholarship Fund
Joan Luria Hines Scholarship
Alec Horwitz Grant
Dr. Thelma Hunt Medical Scholarship Fund
Albert A. and Esther C. Jones Scholarship Fund
Elizabeth Sartor Kahler, M.D., and Ervin N. Chapman, M.D., Fund for Medical Students
Robert I. Keimowitz Scholarship Fund
Ki-Wives of Washington Scholarship Fund
Sidney A. Levine Scholarship Fund
Barbara Logan, M.D., Scholarship Fund
Loughran Medical Scholarship
Medical School Student Financial Assistance Fund
Medical Student Summer Research Scholarships
Dr. Arthur Minsky Medical Scholarship Fund
Esther A. Nathanson Memorial Fund
Carolyn S. and Glen Pincock Scholarship Fund
Morris H. and Helen K. Rosenberg Medical Scholarship Fund
Alvin Slipyan Scholarship Fund
David Perry Steinman Memorial Scholarship Fund
Carol M. and F. Henry Strayer Memorial Scholarship Fund
Surdna Foundation Student Aid Fund
James J. Whisman Scholarship Fund
Gordon Fay Willey Scholarship
Winslow Foundation Scholarship
GW Hospital Women's Board Monta Sommer Special Fund

Loan Funds

Morris and Gwendolyn Cafritz Foundation Loan Fund for Medical Students
Carroll Memorial Loan Fund
Eugene B. Casey Revolving Loan Fund

* The Columbian Women Scholarships are awarded to women who have completed a minimum of 15 hours at this University with a minimum *B* (3.0) average, or the equivalent. A letter of application for these scholarships should be addressed to Columbian Women Scholarships, [illegible] the Alumni Office, George Washington University, Washington, D.C. 20052, no later than January 18.

Consolidated Medical Student Loan Fund
A.M.A. Medical Student Loan Fund
Doreen and Donald Brown Loan Fund
Carr Loan Fund
Himes Loan Fund
Kellogg Medical School Loan Fund
Pfizer Loan Fund
School of Medicine and Health Sciences Student Loan Fund
Sommer Loan Fund
Sutherland Loan Fund
Wrather Loan Fund
Abraham W. and Sophie Damsh Loan Fund
Abraham Gumble Medical School Loan Fund
Katharine Graham Medical School Loan Fund
Robert Wood Johnson Foundation Loan Fund
Rose and Garfield Kass Foundation Loan Fund
Esther A. Nathanson Memorial Medical Loan Fund
Waller Loan Fund
Janice and George Wasserman Medical Student Loan Fund

In addition to the institutional loan funds listed above, two government loan programs are available to students pursuing the Doctor of Medicine degree. The Primary Care Loan Program (previously the Health Professions Student Loan Program) and the Perkins Loan Program both require that students be citizens or permanent residents of the United States, be in good standing with the School, and have exceptional financial need as determined by federal regulations.

Veterans Benefits

The Veterans Benefits Office, located on the third floor of Rice Hall, 2121 I Street, N.W., assists students entitled to educational benefits as active-duty personnel, veterans, or widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. The office also processes certification of enrollment and attendance to the Veterans Administration so that educational allowances will be paid.

When feasible, students entitled to benefits as active-duty personnel, veterans, or dependents of veterans should consult with the veterans counselor prior to submitting an application to the Veterans Administration. All such students should obtain the instruction sheet issued by the veterans counselor, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and includes other information of general interest.

Awards

Philip S. Birnbaum Award—Established by the Bloedorn Foundation and awarded annually to a member of the graduating class for demonstrated interest and ability in the field of primary care.

CIBA-Geigy Award for Outstanding Community Service—Awarded annually to a member of the sophomore class who has performed laudable extracurricular service within the community.

Robert Keith Cole Memorial Award—Awarded annually to a member of the graduating class for academic excellence, community service, and support of fellow students.

Dean's Special Recognition Award—Awarded annually to recognize an outstanding member of the graduating class.

Department of Emergency Medicine Award—Awarded annually to a member of the graduating class who has demonstrated significant interest in and aptitude for the specialty of emergency medicine.

Department of Pediatrics Award—Awarded annually to a member of the graduating class who has demonstrated outstanding ability in the specialty of pediatrics.

Paul L. DeWitt Award for Surgical Excellence—Awarded annually to a member of the graduating class who has demonstrated outstanding ability and future potential in the specialty fields of surgery.

Samuel M. and Miriam S. Dodek Award—Established in memory of Professor Bernhard Zondek, the eminent discoverer of the endocrinology of the human female reproductive cycle. Awarded annually to a member of the graduating class who has attained a commendable knowledge and understanding of the field of female endocrinology.

Rachel Morris Dommick Award—Awarded annually to a member of the graduating class who has demonstrated outstanding ability in the field of obstetrics and gynecology.

Allie S. Freed Award—Awarded annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of preventive medicine.

Walter Freeman Award—Awarded annually to a student in the graduating class who submits the best scientific paper based on original investigation.

Donald H. Glew Memorial Awards—Awarded annually to the winners of the Beaumont Day Competition in student research.

James Douglas Goddard Award in Pharmacology—Awarded annually to the outstanding sophomore medical student in pharmacology.

Alec Horwitz Award—Awarded annually to a senior who has demonstrated exceptional proficiency in the field of surgery.

Alec Horwitz First-Year Scholar Award—Awarded annually to the member of the second-year class who had the highest percentage of credit hours graded at the Honors level during the first year.

Alec Horwitz Memorial Award—Awarded annually to a member of the sophomore class who attains the highest score on Part I of the National Board of Medical Examiners examination.

Oscar Benwood Hunter Award—Established by the George Washington University Medical Society, now known as the George Washington University Medical Alumni Association. Awarded annually to a member of the graduating class who has demonstrated outstanding ability in pathology.

Howard Kane–A.F.A. King–Samuel Dodek Obstetrical Society Award—Established in memory of Dr. Howard Kane and Dr. A.F.A. King, who served as professors in the School of Medicine and Health Sciences. Awarded annually to a member of the graduating class who has demonstrated outstanding ability in obstetrics and gynecology.

Dr. Harold Lamport Biomedical Research Award—Established by the Lamport Foundation in memory of the late, distinguished physiologist, Dr. Harold Lamport. Awarded annually for outstanding research done under the guidance of a member of the faculty.

Huron W. Lawson Award—Established by Mrs. Lawson in memory of her husband, who was a distinguished member of the medical staff of the University. Presented annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of obstetrics and gynecology.

Benjamin Manchester Award—Established by a grateful patient in honor of Dr. Benjamin Manchester, professor emeritus of clinical medicine. Awarded annually to a member of the graduating class who has an outstanding record and shows promise of real humanitarianism in the practice of medicine.

Medical Alumni Association Award—Granted by the GW Medical Alumni Council and awarded annually to a member of the graduating class who has shown exceptional leadership ability, the potential for continuing involvement

and leadership as an alumnus, and the likelihood of bringing high honor to the medical school.

Merck Manual Awards—Awarded annually to three members of the graduating class who show high scholastic achievement in medical studies.

Mark Millen Memorial Award—Awarded annually to a member of the graduating class who has demonstrated exceptional proficiency in the field of rheumatology.

Julius S. Neviaser Award—Awarded annually to a member of the graduating class who has demonstrated outstanding ability in the clinical aspects of orthopaedic surgery.

William Newman Award—Established in honor of the late, distinguished surgical pathologist, Dr. William Newman. Awarded annually to a member of the graduating class who has demonstrated great aptitude and interest in the field of pathology.

John Ordronaux Award—Awarded annually to the member of the graduating class who has the highest scholastic standing.

Hyman R. Posin Award—Established by Sheila Sloane Dusseau. Awarded annually to a member of the graduating class who has demonstrated outstanding sensitivity to neurologic patients and superior knowledge of neurology.

Laurence A. Rupee Award—Awarded annually to the member of the graduating class who has the highest scholastic standing.

Walter F. Rosenberg Award—Awarded to the senior medical student who shows the greatest interest, proficiency, and scholastic achievement in dermatology.

William G. Schaffner Award—Awarded annually to a senior student for the best original essay or thesis on some medical subject of current public interest.

Society for Academic Emergency Medicine Award for Excellence—Awarded to a member of the graduating class who has demonstrated outstanding proficiency in the practice of Emergency Medicine.

Jerry M. Wiener Award in Psychiatry—Awarded annually to a member of the graduating class who has performed at an outstanding level in psychiatry and plans to pursue a career in the field.

Honor Societies

Alpha Omega Alpha—Third- and fourth-year candidates for the M.D. degree meeting the qualifications specified by the constitution of this national medical honor society are eligible for election to membership.

William Beaumont Medical Society—Medical students who have performed original research in the life sciences are eligible for membership, based on the submission of an acceptable abstract of the research and election by society members. Outstanding students present their research findings at the annual Student Research Day. The society also sponsors guest lectures in medical research and assists students in finding research opportunities within the Medical Center.

Kane–King–Dodek Obstetrical Society—The 15 third- and fourth-year candidates for the M.D. degree who maintain the highest grades in their work in obstetrics are eligible for membership.

Health Sciences Programs

The School of Medicine and Health Sciences offers a broad range of undergraduate and graduate programs to prepare health sciences professionals for roles in selected specialties within the medical professions. These programs emphasize the interdependent roles and responsibilities of the network of health professionals who bring a variety of skills and expertise to the health care team. The programs strive to produce graduates with a firm foundation in the principles and practice of critical thinking and clinical skills and with preparation to take on leadership roles in new models of health care delivery.

The Bachelor of Science in Health Sciences is awarded for completion of the programs in clinical laboratory science, emergency medical services, and radiologic sciences. The Master of Science in Health Sciences is offered with a field of study in the physician assistant program. In addition, certificates are awarded to degree candidates who complete designated requirements in the following programs: clinical laboratory science, physician assistant, and radiation therapy. Certificate-only programs include an undergraduate-level paramedic certificate; a post-baccalaureate certificate in clinical laboratory science, obstetric sonography, radiation therapy, and vascular sonography; and a post-master's certificate in nurse practitioner. Graduate credit is offered toward the Post-Master's Nurse Practitioner Certificate and the Master of Science in Nursing in collaboration with the George Mason University College of Nursing and Health Science.

Three degree programs are offered via distance education. The Bachelor of Science in Health Sciences in clinical health sciences is available to active-duty military personnel who have completed the U.S. Navy's independent duty corpsman program. For those with health sciences professional certification or credentials, the Bachelor of Science in Health Sciences is offered in clinical management and leadership. The Master of Science in Health Sciences in clinical leadership is provided for certified physician assistants. Information on these programs is found at www.gwumc.edu/healthsci.

Contract programs include a certificate program and Associate in Science in health science laboratory technology and the Master of Science in Health Sciences in oral biology.

Admission

While specific criteria vary among programs, applicants to all GW health sciences programs must present evidence of good character and an academic background appropriate for the intended program of study. Meeting the minimum requirements for admission does not assure acceptance; individual programs often set higher admission standards, and the number of spaces available for new students limits the number that can be accepted.

To be considered for admission, applicants must submit a completed application form, together with all required supporting documentation and a nonrefundable application fee. Application packets are available from and should be returned to the Office of Recruitment and Admissions, Health Sciences Programs, School of Medicine and Health Sciences, The George Washington University, Washington, D.C. 20037. Applicants should refer to the individual program descriptions for information on program prerequisites, program-specific supporting documents, and application deadlines, since these vary by program. It is the responsibility of applicants to ensure that all required application materials are submitted by the designated deadlines. Unofficial copies, facsimiles, or photocopies of transcripts, certificates, or diplomas will not be accepted. All records become the property of the University and cannot be returned.

Applicants to Undergraduate Degree Programs—With the exception of the emergency medical services program, baccalaureate programs offered in the

health sciences are designed for upper-division transfer students. Applicants are expected to complete approximately 60 credit hours of course work from an accredited postsecondary institution prior to entry. Applicants who have fewer than 30 credit hours of college-level course work must submit the GW Application for Undergraduate Admission to the Undergraduate Admissions Office, The George Washington University, Rice Hall, Washington, D.C. 20052.

If an applicant has previous college-level academic credit, official transcripts must be submitted from each academic institution attended, regardless of whether credit was earned or is desired. If an applicant has 30 or more credit hours, the transcript(s) must indicate: (1) a cumulative grade-point average of 2.0 on a scale of 4.0; (2) that the applicant is in good standing as to scholarship and conduct; and (3) that the applicant is eligible to return to the academic institution most recently attended. Applicants to the clinical laboratory science and emergency medical services programs must have a cumulative grade-point average of 2.5 on a scale of 4.0. Students who have been academically dismissed or suspended will not be considered for admission for at least five years from the date of their last suspension or dismissal. Official College Board College-Level Examination Program (CLEP) score reports, where applicable, should be included as part of the application packet.

Applicants to Certificate-Only and Graduate Degree Programs—Applicants must submit a completed application packet as described under the individual program guidelines.

Advance Tuition Deposit

Upon notification of acceptance, an advance tuition deposit will be required of all full-time, on-campus students, including those readmitted. The deposit is credited toward tuition and is not refundable. Payment of the orientation fee must be submitted along with the tuition deposit and is also not refundable.

International Applicants

The following additional requirements pertain to international applicants:

Required Records—Official copies of all required documentation (transcripts, diplomas, and certificates as well as any other records listing subjects studied, grades received, examinations taken, the results of state examinations, and degrees received) must be submitted in the language in which the institution keeps its official records. If these documents are in a language other than English, they must be accompanied by a certified English translation.

Language Tests—Applicants from countries where English is not an official language are required to submit official scores on the Test of English as a Foreign Language (TOEFL). The requirement is waived for international applicants who hold a baccalaureate or higher degree from a regionally accredited U.S. institution of higher learning. A minimum TOEFL score of 550 is required for admission. Applicants should address inquiries to TOEFL, CN 6151, Princeton, N.J. 08541-6151. The completed registration form to take the TOEFL must be returned well in advance of the semester for which admission is sought.

Admitted students from countries where English is not an official language are also required to take an English as a Foreign Language (EFL) placement test prior to registering at the University; this requirement is waived for students with a TOEFL score of at least 600. Depending on the results of this test, the student's academic program may be restricted in number and type of courses that can be taken. Students who are required to take EFL courses at an intensive level might not be able to take other courses during that semester.

Financial Certificate—A Financial Certificate must be completed and submitted with the application for admission of all international students planning to study at the University under the authorization of either a student (F) or exchange

visitor (J) visa. Satisfactory completion and submission of the Financial Certificate is required for the issuance of a Form I-20 or IAP-66.

Admission as an Unclassified Student

A student who wishes to take individual courses in health sciences programs must obtain permission to register as an unclassified student in the School of Medicine and Health Sciences. The associate dean, in conjunction with the appropriate program director and chair of the department offering the course, will determine if permission to register will be granted to an unclassified student. Permission to take individual courses, if granted, will generally be limited to a total of 15 credit hours.

Credit earned for courses taken as an unclassified student may be transferred to a degree program at the University if the courses are applicable to the program, have been taken for credit, and have been completed with the minimum grade required in the program. Successful completion of course work taken as an unclassified student does not guarantee admission to a degree program.

Admission with Conditions

Admission with conditions to one of the health sciences programs may be offered at the discretion of the program director and with the approval of the associate dean. The terms of admission will be outlined in the letter of acceptance from the University.

Readmission

Students who were previously registered in a health sciences program at the University but who did not register during the immediately preceding semester (summer sessions excluded) must apply for readmission. Students who have attended one or more academic institutions while absent from this University must have complete official transcripts sent directly to the Office of Recruitment and Admissions, Health Science Programs, from each institution attended. Students seeking admission as degree candidates after previous enrollment in unclassified status must submit all entrance credentials not previously received or required. Applications for readmission are considered on the basis of regulations currently in effect.

Transfer Within the University

Application for transfer to another school within the University must be made to the appropriate admitting office on the form provided by that office. A maximum of 30 credit hours earned in the Division of University Programs may be applied toward a bachelor's degree in the health sciences programs.

Advanced Standing

Advanced standing may be awarded for appropriate course work completed at other accredited institutions provided minimum grade requirements have been met. The minimum acceptable grade is *C* for course work to be applied toward an undergraduate degree and *B* for course work to be applied toward a master's degree. Advanced standing may also be awarded for nontraditional classroom or clinical experience as outlined below. The University reserves the right to refuse transfer credit in part or in whole or to allow credit provisionally. Health sciences degree programs vary in the amount of advanced standing they will award. For bachelor's programs, no more than 66 credit hours can be accepted as advanced standing from a two-year institution.

Degree candidates who are currently enrolled at this institution and plan to take courses or placement examinations at other accredited institutions for transfer credit must first obtain permission from the associate dean. A course approval form must be completed and approved by the program director and the associate dean.

Credit by Examination, from Service Schools, from Noncollegiate Organizations, and by Nontraditional Methods—Credit may be awarded through one or any combination of the following:

Special Departmental Examinations—A student may request approval from the associate dean, through the program director, to petition any department to take an examination covering the subject matter of a specific course. Approval of such a request may be granted only when the student has offered evidence of sufficient occupational or educational background to indicate a reasonable command of the subject matter; departments reserve the right to deny such requests. Assigning credit by special departmental examination will depend on the department's evaluation of the examination. The examinations will normally be at least three hours' duration. A fee for each course examination is charged for preparing, administering, and grading the examination.

In some instances, students may instead request approval to take a waiver examination to satisfy a curriculum requirement. The examination will normally be of at least one hour's duration; a fee is charged for each waiver examination. Students do not receive academic credit for waiver examinations. A student who has previously taken examinations to waive course requirements may not subsequently take a special departmental examination for credit in the same course.

Credit for College Board College-Level Examination Program (CLEP)—CLEP offers two types of examinations. General and Subject Examinations. CLEP General Examinations are offered in five areas: mathematics, humanities, natural sciences, English composition, and social sciences and history. Only the CLEP General Examinations in humanities, natural sciences, and social sciences and history may be used to fulfill degree requirements for health sciences students. Subject Examinations must be taken to fulfill degree requirements in mathematics and English.

Upon admission to degree candidacy, credit may be assigned for General CLEP examinations passed at approximately the 50th percentile or above. Credit is assigned, with some exceptions, for the Subject Examinations passed at the level recommended in the College Board Model Policy. Credit may not be earned by passing the examination after taking an equivalent course. Arrangements for taking the examinations are the responsibility of the applicant and should be made through the College Board College-Level Examination Board, CN 6601, Princeton, N.J. 08541-6601.

Credit from Military Service Schools—A limited amount of credit may be assigned for selected military service school courses in accordance with recommendations from the American Council on Education's *Guide to the Evaluation of Educational Experiences in the Armed Services*.

Credit Earned Through USAFI and DANTES—Credit may be assigned for approved United States Armed Forces Institute (USAFI) and Defense Activity for Nontraditional Education Support (DANTES) courses.

Credit for Courses Offered Through Correspondence—A limited amount of credit may be assigned for selected courses taught by nontraditional methods, provided that such courses require the student's physical presence during a monitored final examination. Assignment of such credit will require a statement from the sponsoring agency that such an examination was a required part of the course.

Academic Regulations

The Office of Health Sciences Programs publishes a Student Handbook each academic year that contains updated information on the program's policies, regulations, and other matters of concern to matriculated students. It is the responsibility of the student to be aware of the information contained in this bulletin and in the Handbook.

Scholarship Requirements

The minimum requirement for the Bachelor of Science in Health Sciences, Master of Science in Health Sciences, or the certificate programs will be the successful completion of all required courses. Students in the undergraduate degree and undergraduate-level post-baccalaureate certificate programs must attain a minimum cumulative grade-point average (GPA) of 2.0 (2.5 in clinical laboratory science), and a minimum cumulative GPA of 2.5 in designated core courses. A minimum grade of *C* is required for Path 118 and 119 in the clinical laboratory sciences program and for all clinical courses in the radiologic sciences program. A minimum grade of *B* is expected for all course work in the post-master's nurse practitioner program. Students in the M.S.H.S. degree program must maintain a minimum cumulative GPA of 3.0, and all courses must be completed with a grade of *C* or better. Although transfer credit may be assigned, courses taken at other institutions are not considered in computing the GPA. Programs may, in some instances, establish higher GPA requirements.

Attendance

Students may be dropped from any course for undue absence. A student suspended for any cause may not attend classes during the period of suspension.

Evaluation of Academic Performance

Faculty are responsible for evaluating the performance of students in a meaningful, useful, and timely manner and for assigning grades on a basis that is rational, just, and unbiased. The authority for assignment of grades rests with academic departments or with faculty in the respective programs. Official grades for course work are mailed to students from the Office of the Registrar each semester and are not given out by instructors.

Grades in Undergraduate Degree or Certificate and Post-Baccalaureate Certificate Programs—The following grading system is used: *A*, Excellent; *B*, Good; *C*, Satisfactory; *D*, Low Pass; *F*, Fail; *I*, Incomplete; *IPG*, In Progress; *W*, Authorized Withdrawal; *Z*, Unauthorized Withdrawal. Other grades that may be assigned are *A*−, *B*+, *B*−, *C*+, *C*−, *D*+, and *D*−. Except for courses that specifically state that repetition for credit is permitted, a candidate for an undergraduate degree, undergraduate-level certificate, or post-baccalaureate certificate at this University may not repeat a course in which a grade of *D* or better was received, unless a petition to do so is approved by the associate dean upon recommendation of the program director. If a course is repeated, the first grade remains on the student's record and is included in the cumulative GPA.

Grades in Graduate Degree and Post-Master's Certificate Programs—The following grading system is used: *A*, *B*, *C*, *F*, *I*, *IPG*, *W*, and *Z*. At the discretion of the program and individual faculty, '+' or '−' grades may also be assigned. Except for courses that specifically state that repetition is permitted, a candidate for a graduate degree or certificate at this University may not repeat a course in which a grade of *C* or better was received, unless a petition to do so is approved by the associate dean upon recommendation of the program director. If a course is repeated, the first grade remains on the student's record and is included in the cumulative GPA.

Incomplete, In Progress, Withdrawal—When another grade has not been assigned, the symbol *I*, *IPG*, *W*, or *Z* will be recorded. The symbol of *I* indicates that the instructor has received a satisfactory explanation for the student's inability to complete the required work of the course. The grade may be used only if the student's prior performance in the course has been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. Incomplete work must be made up by a date agreed on by the instructor and the student, un-

no later than the last day of the examination period for the semester immediately following the semester or summer session in which the grade of *I* is assigned. An extension of one additional semester can be requested by the student and may be approved by the program director. When work for the course is completed, the grade earned will be indicated in the form of *I-* followed by the grade. The indication of *I* cannot be removed from the transcript. An Incomplete that is not changed within the allotted time automatically becomes an *F*.

The symbol of *IPG* is reserved for courses (such as special projects) in which the final class date extends beyond the official University deadline for submitting grades. Once the course has been completed, the *IPG* will be removed from the transcript and the earned grade recorded.

The Grade-Point Average—Scholarship is computed in terms of the grade-point average, based only on the student's record in this University. The grade-point average is computed from grades as follows: *A*, 4.0; *A−*, 3.7; *B+*, 3.3; *B*, 3.0; *B−*, 2.7; *C+*, 2.3; *C*, 2.0; *C−*, 1.7; *D+*, 1.3; *D*, 1.0; *D−*, 0.7; *F*, 0, for each credit hour for which the student has registered in a degree program. (Grades of *F* will be computed in the grade-point average but will not be considered as fulfilling degree requirements.) Courses marked *W*, *I*, or *IPG*, are not considered in determining the average, except that any course in which an *I* or *IPG* has been assigned will be included when a final grade has been recorded.

Appeal Procedures for Cases of Alleged Improper Academic Evaluation—Students who believe that a grade or evaluation is unjust or inaccurate may submit a petition through the department or program that offers the course. If a mutually satisfactory resolution is not achieved, the student may use the following appeal procedures:

1. The student must submit a written appeal to the associate dean.
2. The associate dean will refer the appeal to the Health Sciences Committee chair, who will form a three-person committee to serve as a peer review body. The committee will consist of the chair of the department or director of the program and two other members of the Health Sciences Committee who are not involved in the case. Should the chair of the Health Sciences Committee be the member of the faculty alleged to have made the improper academic evaluation, the associate dean will choose the three members of the peer review body from the members of the Health Sciences Committee. If a sufficient number of faculty is not available from within the Committee, other faculty from the health sciences programs will be appointed.
3. The peer review body will conduct a hearing at which the student and the faculty member have an opportunity to state, in each other's presence, their views on the academic evaluation given to the student.
4. If the peer review body finds in favor of the student and upholds the complaint, yet the faculty member refuses to alter the academic evaluation at issue, the Health Sciences Committee will meet with the peer review body to review the case. The Committee will then advise the associate dean on what steps should be taken to resolve the issue. Final action rests with the associate dean.

Academic Standing

A matriculated student is considered to be in good academic standing by the School of Medicine and Health Sciences provided that he or she has not received a warning and is not on probation.

Warning—A student in an undergraduate degree or certificate program whose grade in the core curriculum falls below 2.5 in any one semester will receive a warning letter from the director of the program in which the student is enrolled. A copy of the letter is forwarded by the program to the office of the associate dean for inclusion in the student's file.

Academic Probation—A full-time undergraduate student who has attempted a minimum of 12 credit hours of course work and whose cumulative GPA is below 2.0 will be placed on academic probation. This probation extends over the period in which the student attempts an additional 12 credit hours of course work. Students while on probation will be allowed to register for no more than 13 credit hours per semester, unless approved by the program director and the associate dean.

A part-time undergraduate student who has attempted a minimum of 6 credit hours of course work and whose cumulative GPA is below 2.0 will be placed on academic probation. This probation extends over the period in which the student attempts an additional 6 credit hours of course work.

A full- or part-time graduate degree candidate whose cumulative GPA falls below 3.0 will be placed on academic probation. This probation extends during the period in which the student attempts 9 credit hours of course work.

Suspension—An undergraduate student whose cumulative GPA remains below 2.0 after a period of probation may be suspended. A student suspended for poor scholarship may not register for any course work at the University, even as an auditor. A suspended student may apply for readmission after the lapse of the semester following suspension. Evidence must then be presented to the associate dean, through the student's program director, demonstrating that the student is now better prepared to pursue academic course work. Any student suspended twice for poor scholarship will not be readmitted.

A graduate degree candidate who is suspended for failure to raise the cumulative GPA to 3.0 may apply for readmission after the lapse of one calendar year by submitting evidence that he or she is now better prepared to pursue graduate course work. If the student fails to achieve the minimum GPA of 3.0 at the end of the semester following readmission, the program director may recommend that graduate study be terminated and further enrollment prohibited. This will be reviewed by the associate dean, whose recommendation will then be forwarded to the dean for academic affairs.

Dismissal—Any student who has received one or more failing grades during a semester may be recommended for dismissal by the program director. This will be reviewed by the associate dean. At the discretion of the associate dean, the recommendation may also be reviewed by the Health Sciences Committee before submitting the recommendation to the dean for academic affairs. The final decision about dismissal rests with the dean for academic affairs.

Dean's List

The name of any full-time undergraduate student who achieves a GPA of 3.5 or higher in any one semester with no grades below *B*− will be placed on the Dean's List for that semester.

Withdrawal

Withdrawal from a course or from the University requires the approval of the student's advisor, each course instructor, and the associate dean. Permission to withdraw from the University will not be granted to a student who does not have a clear financial record (see Payment of Fees under Fees and Financial Regulations). The deadline for withdrawal from a course is the end of the fourth week of classes in the semester.

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations.

Adding Courses

The deadline for adding a course is the end of the second week of classes.

Changes in Program of Study

Changes Within Health Sciences Programs—A student may not substitute one course for another without the approval of the program director and the associate dean. After the deadlines for dropping or adding courses, a student must obtain the permission of the course instructor, the program director, and the associate dean to withdraw from a course or to change status from credit to audit or audit to credit.

Transfer Within Health Sciences Programs—To apply for a transfer from one health sciences program to another, a written request must be submitted to the Office of Health Sciences Programs, along with the necessary supporting documentation required by the program.

Credit

Credit is awarded only after registration for a course and satisfactory completion of the required work, or upon assignment of advanced standing.

Auditing

A student who has been admitted to a health sciences program may register as an auditor in a class only with the permission of the instructor, the faculty advisor, and the associate dean. An auditor receives no academic credit and is not required to take active part in the class or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. The on-campus tuition rate is charged for audited courses.

Programs of Study

Students enrolled in undergraduate degree, undergraduate-level certificate, or post-baccalaureate certificate programs must meet with their faculty advisor to complete a program of study form, listing all course work required for the degree or certificate, including applicable transfer credit. The program of study must be approved by the associate dean for health sciences. If an approved program of study is not on file in the associate dean's office by the end of a student's first semester (or session) of study, the student will not be permitted to continue in the program. Subsequent changes to the program can be made through the submission of a program of studies revision form.

Transcripts of Record

Official transcript of student records are issued by the Office of the Registrar on written request of the student or former student who has paid all charges, including any outstanding student loan installments, due the University at the time of the request. A fee is charged for each transcript. Partial transcripts are not issued.

Continuous Enrollment

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. Students who break continuous enrollment at the University and do not request and receive a leave of absence (see below) must apply for readmission and, if granted, are subject to the requirements and regulations then in force.

Students who plan to attend other institutions and apply credit earned toward graduation from this University must first obtain written approval from the program director and the associate dean.

Leave of Absence

A student who must interrupt active pursuit of the degree may petition the associate dean, through the program director, for a leave of absence for a specified

period of time, generally limited to one calendar year. If the petition is approved, the student must register for leave of absence in each fall and spring semester, following regular registration procedures. Degree candidates who discontinue their studies without being granted a leave of absence and students granted leaves who do not return to active study at the close of the period of approved absence must apply for readmission and are subject to the regulations and requirements then in force. The right to use University facilities is suspended while the leave is in effect.

Graduation Requirements

Degrees are conferred in January, May, and September. Graduating health sciences students may participate in the commencement ceremony held each year in May.

To be recommended for graduation by the faculty, students must have met admission requirements, have completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree, have filed an application for graduation prior to the published deadline, and be free from all indebtedness to the University. Registration, either for course work or for continuous enrollment, is required for the semester or summer session at the close of which the degree is to be conferred.

Applications for graduation must be filed by October 1 for January graduation, February 1 for May graduation, and July 1 for September graduation.

Residence Requirements—The minimum number of credit hours that must be satisfactorily completed in residence in the School of Medicine and Health Sciences are listed below; specific programs may establish higher residency requirements.

Bachelor of Science in Health Sciences—30 of the last 60 credit hours required by the program

Master of Science in Health Sciences—one-half of the total course work required by the program

Courses applicable to the degree taken while registered in any division of The George Washington University in the semester immediately prior to admission to degree candidacy in the health sciences are counted as courses in residence.

Honors—Bachelor's degrees with honors are awarded to students whose academic records give evidence of particular merit. The student's grade-point average determines the level of honors as follows: ***cum laude***, 3.4–3.59; ***magna cum laude***, 3.6–3.79; ***summa cum laude***, 3.8–4.0. The grade-point average includes all course work completed at GW and is not rounded off. To be eligible for an honors designation, a student must complete at least 60 hours of course work at GW.

The grade-point average is calculated by the Office of the Registrar, and the honors designation is entered on the transcript and the diploma of those students who earn an honors designation. If honors are entered in the commencement program, honors status will be determined on the basis of work completed by the end of the seventh term and entered only for those students who have completed seven-eighths of the credit hours required for the degree. Honors indicated on the diploma are calculated on the basis of all course work completed. The diploma and transcript are the official indication that a degree was conferred and honors awarded.

Award of Certificates to Degree Candidates

Certificates are awarded to degree candidates who successfully complete designated requirements in the clinical laboratory science, physician assistant, and radiation therapy technology programs. Recipients must be free from all financial indebtedness to the University before certificates are awarded.

Honor Society

Health sciences students who meet the qualifications specified by the constitution of Alpha Eta, a national honor society, are eligible to be nominated by a program director, faculty, or other Alpha Eta members.

Financial Aid

The George Washington University's program of financial assistance for undergraduate students is described in *Assistance with Your Assistance: A Financial Aid Source Book*, a pamphlet available from the Office of Student Financial Assistance, The George Washington University, Washington, D.C. 20052. Undergraduate aid consists of two basic types: awards for academic achievement or talent without reference to financial circumstances (merit scholarships) and scholarships, grants, loans, and employment based on academic achievement and demonstrated financial need. All undergraduate gift aid (institutional scholarships and grants, and federal grants) requires that the recipient be working on the first undergraduate degree and be registered for a full-time course load at GW. Students are limited to eight semesters of institutional aid. Loans and resident assistantships not based on financial need are available.

Several offices on campus provide information on financial assistance for graduate students. A general overview of financing options is provided in the brochure *Graduate Funding Opportunities*, published by the Office of Fellowships and Graduate Student Support, The George Washington University, Washington, D.C. 20052. Forms and information on federal loans for graduate students can be obtained from the Office of Student Financial Assistance. Information on the Federal Work–Study Program, cooperative education opportunities, and on- and off-campus employment is available from the GW Career Center.

Gift aid (scholarships, grants, fellowships, assistantships, etc.) is taxable to the extent that it exceeds the allowable costs of tuition, fees, and required books and supplies or is dedicated to other costs, such as room and board. Federal grants may be taxable if, together with other gift assistance, they exceed the allowable costs. In the case of a student who is awarded tuition scholarships, grants, or awards from more than one source, the combined amount cannot exceed tuition charges; institutional aid will be adjusted to this limit.

In general, consideration for financial aid is restricted to students in good academic standing who meet the minimum grade-point average for particular awards and are not financially encumbered by any other University office. Applications for institutional or federal aid cannot be processed if the relevant tax returns have not been filed in accordance with the IRS Code. Documents submitted as part of applications become the property of the University and cannot be returned. Federal regulations require that the University report suspected cases of fraud or misrepresentation to the appropriate federal, state, and local authorities.

Information on financial aid is accurate at the time each Bulletin is prepared for press. Future changes in federal regulations or institutional policies may alter the application requirements or program guidelines.

Regulations on the Evaluation of Professional Comportment

Students enrolled in undergraduate and graduate degree and certificate health sciences programs* are required to conform to, and are entitled to the benefits of, the Code to Student Rights and Responsibilities (hereinafter referred to as the Code) and the Code of Academic Integrity, as well as all other rules, regulations, and policies with University-wide applicability. Because of the Health Sciences programs' unique requirements, however, the University Board of Trustees has

*As used in this section, "certificate program" refers to an established program in which a certificate is awarded at completion, rather than a degree program in which both a degree and a certificate are awarded at completion.

established the following Regulations for health sciences students. Certain procedures in these Regulations are designed to supplement policies established by the Guide; others are meant to replace procedures set forth in the Guide. For example, all cases involving alleged misconduct by health sciences degree and certificate candidates will be processed under these Regulations, unless the Dean for Academic Affairs of the School of Medicine and Health Sciences or his/her designee decides in a particular case to have the case processed under the Guide's Code of Student Conduct. In the case of any inconsistency or ambiguity between these Regulations and University-wide rules, regulations, and policies, including the Guide, these Regulations will govern.

As members of the health care community, health sciences students are expected to behave in a manner consistent with the principles and obligations inherent in professional practice. Professional maturity, integrity, and competence are expected of students in every aspect of the clinical setting with preceptors, coworkers, and patients. Students are obliged to practice diligence, loyalty, and discretion in the patient–provider relationship.

Some behaviors or patterns may raise concerns as to the student's suitability to continue in the program of study. Inappropriate behaviors for a health profession student may include, but are not limited to, breaching patient confidentiality, using illegal drugs or abusing controlled substances, becoming sexually involved with a patient, undertaking a procedure or scope of practice beyond that of a student, disobeying or showing disrespect for preceptors, showing a judgmental attitude toward patients, or revealing a lack of concern or compassion in practice.

The process described below is intended to deal with behaviors that are unacceptable to the School of Medicine and Health Sciences and raise questions about the student's fitness for clinical practice.

1. When a problem is perceived with reference to a student's professional comportment (other than academic dishonesty, which is covered by the University's Code of Academic Integrity), the observer will communicate this concern to the program director. If the communication is verbal, it must be confirmed within five working days by a signed, written statement; otherwise, the concern will not be pursued further. If the program director determines that further action is required, the concern will be communicated, in writing, to the associate dean for health sciences.
2. Upon receiving such a communication, the associate dean will create a confidential file in which all documents pertaining to the issue or issues will be placed. The contents of the file will be saved for a period of not less than five years from the date of separation or graduation from the School of Medicine and Health Sciences. Access to this file will be restricted to the student under consideration, the associate dean, the dean for academic affairs, and the Health Sciences Committee.
3. The associate dean will notify the student in writing upon receipt of the communication. The notice will include a copy of these regulations.
4. The associate dean will meet with the student as soon as possible. At that meeting, or as soon thereafter as possible, the associate dean will do one or more of the following:
   a. Review the matter;
   b. Advise the student;
   c. Refer the case to an Ad Hoc Subcommittee on Professional Comportment; and/or
   d. Suspend the student pending investigation and recommendation of the Ad Hoc Subcommittee on Professional Comportment.
5. The involvement of, and actions taken by, the associate dean may be continuing in nature.

Paragraphs 6 through 19 apply if the student is referred to the Ad Hoc Subcommittee on Professional Comportment.

6. The Ad Hoc Subcommittee on Professional Comportment will be named by the chair of the Health Sciences Committee. The Subcommittee will consist of three faculty members from the Health Sciences Committee; the chair of the Subcommittee will be designated by the chair of the Health Sciences Committee.
7. The associate dean will notify the student in writing of the composition of the Subcommittee. The student will be allowed ten calendar days from the mailing of this notice to object to any person's appointment to the Subcommittee. Such objection must be sent in writing to the associate dean. The associate dean will determine whether an objection warrants the substitution of one or more persons to the Subcommittee. Substituted members will be selected from the Health Sciences Committee.
8. The Subcommittee will investigate the allegation. The Subcommittee will review the student's confidential file and interview the student. The Subcommittee also may gather and review other material and interview any person who the Subcommittee, in its sole discretion, believes may have relevant information to contribute. The Subcommittee, when it deems appropriate, may ask the associate dean to refer the student for a medical, psychiatric, or psychological evaluation.
9. If the Subcommittee requests such an evaluation, the associate dean will make the referral. No student may be compelled to be evaluated; but, if s/he agrees to be evaluated, the cost will be borne by the University and the student will be asked to authorize the professional consultant to make a written report to be included in the student's confidential file. This authorization of the release of information derived from the evaluation will be made only after the student has had a chance to review the written report.
10. The student under review and/or the student's attorney or advisor may attend the information-gathering sessions. The information-gathering sessions are not in the nature of an adversarial proceeding; the student and the student's attorney or advisor, however, may submit questions to be answered by persons interviewed by the Subcommittee. The procedure regarding their questioning is left to the sole discretion of the Subcommittee. The student has the right to speak to the Subcommittee members and submit other material. The legal Rules of Evidence, including, but not limited to, those rules regarding relevancy and hearsay, are not applicable. The student may suggest that the Subcommittee interview additional persons, but the decision to interview such persons is left to the sole discretion of the Subcommittee. The student and the student's attorney or advisor cannot be present when the Subcommittee meets in executive session.
11. Meetings of the Subcommittee are confidential. Minutes of the Subcommittee will be placed in the student's confidential file upon the completion of the Subcommittee's review.
12. The chair and all the members will be required to be present for all meetings of the Subcommittee.
13. The Subcommittee will make its final recommendation(s) to the associate dean. Such recommendation(s) will be in writing and will include findings of fact and the reasons for the recommendation(s). The recommendation(s) could include, but are not limited to, one or more of the following:
   a. Advising the student;
   b. Recommending that the student seek professional assistance, at the student's expense;
   c. Recommending conditions with which the student must comply in order to continue in the program;
   d. Recommending temporary suspension from the program; and/or
   e. Recommending dismissal from the program.

The Subcommittee will make an additional recommendation regarding whether the confidential file will be made a part of the student's permanent academic file.

14. If the Subcommittee recommends suspension or dismissal from the program, or any modifications of the academic program, the matter will be referred to the Health Sciences Committee, which will review the confidential file and the report of the Subcommittee. The chair of the Subcommittee will present the Subcommittee report to the Committee as a whole and will respond to inquiries from the Committee members. The student and/or his or her attorney or advisor may attend the Subcommittee chair's presentation and may submit a written statement to the Committee. The student and/or his or her attorney or advisor will not be able to question the Subcommittee chair or the Committee members or present additional witnesses and cannot be present when the Committee meets in executive session. Although the student may be interviewed by the Committee if the student attends the meeting, the meeting will not be a *de novo* hearing of the issue or issues. The Committee will either refer the issue(s) back to the Subcommittee, if additional information is required, or will submit its written recommendations, along with those of the Subcommittee, to the associate dean.
15. The associate dean will review the student's confidential file, the report of the Subcommittee, and the report of the Committee, if any. The associate dean's recommendation will then be forwarded to the dean.
16. The dean will take whatever action is appropriate, including dismissal from the program. The dean will inform the student of the decision in writing.
17. The student will have fifteen calendar days in which to appeal the decision of the dean. Such appeal will be in writing and sent to the vice president for health affairs. The scope of this appeal is for the vice president for health affairs to determine compliance with the procedures set forth in these Regulations on Evaluation of Professional Comportment. Failure to appeal the decision will be deemed a waiver of any and all rights to challenge the dean's decision and will be deemed an acceptance of the same.
18. The vice president for health affairs will make the final decision.
19. At any time during the process, if the student in question is accompanied by an attorney, the University will have its attorney present. The student, therefore, is required to inform the associate dean's office one week in advance of the hearing if counsel is to be present.

Programs Leading to the Bachelor of Science in Health Sciences

All B.S.H.S. candidates are required to successfully complete 15 credit hours of health sciences core courses: HCS 751, *Current Issues in Bioethics*, and HSci 101, 102, 103, and 104.

Clinical Laboratory Science Program

Admission to Degree Candidacy

In addition to the general requirements for admission to degree candidacy for health sciences programs, students applying to the program must have satisfactorily completed 60 credit hours at an accredited college or university, including 6 hours of English composition, 16 hours of chemistry (including inorganic and organic); 8 hours of general biology; 12 hours of humanities or social sciences; 3

hours of mathematics (precalculus or calculus); 4 hours of microbiology; and 11 hours of electives. A personal interview is required for admission. Applicants must submit letters of recommendation from science instructors and a signed Technical Standards Acknowledgement Form (available from the clinical laboratory science program), indicating their ability to meet the required standards of the program.

Degree Requirements

In addition to the general curriculum requirements listed above, the program requires satisfactory completion of 65 credit hours in the major, consisting of 15 credit hours of health sciences core courses; Path 118, 119, 121, 122, 123, 124, 125, 126, 127, 130, 131, 132, 133; and 9 hours of electives selected in consultation with the faculty advisor. Students in clinical laboratory science must receive a minimum grade of *C* in Path 118 and 119 and are required to maintain a minimum cumulative grade-point average of 2.5 throughout their program.

Emergency Medical Services Program

Admission to Degree Candidacy

In addition to the general requirements for admission to degree candidacy for health sciences programs, the following records are to be included where applicable—verification of satisfactory completion of prehospital clinical training, proof of current participation in an emergency medical services system, and photocopies of scores or certificates from national registry examinations or certifying board examinations. An interview is recommended. Before the first day of classes, students admitted to the program must submit a letter from a physician attesting to their good health and including the results of testing for tuberculosis and a statement of current immunization status.

Degree Requirements

The program requires satisfactory completion of a minimum of 123 credit hours of course work, distributed as follows:

General Curriculum Requirements—35 credit hours, consisting of 6 hours in English composition (Engl 9 or 10, and 11); BAdm 51; 6 hours each of mathematics and humanities or social sciences; 8 hours of biological sciences; and 3 hours each of psychology or sociology and statistics (Stat 51).

Courses in the Major—88 credit hours, consisting of the 15 credit hours of health sciences core courses, the core courses in the major, and either the Emergency Management option or the Out-of-Hospital Emergency Medical Services option, as listed below:

Core Courses in the Major—EMed 101, 110–11, 114, 140.

Emergency Management option—BAdm 52; Comm 40; Econ 11–12; EMed 104, 108, 113, 118, 160, 164, 166, 170, 172, 196, 198, and 12 hours of electives selected in consultation with the faculty advisor. (Admission to the Emergency Management option has been temporarily suspended.)

Out-of-Hospital Emergency Medical Services option—EMed 99, 130–31, 134–35, 141, 142, 143–44, 145, 154, 155, 159, 164, and 21 hours of electives selected in consultation with the faculty advisor.

Radiologic Sciences Program

Admission to Degree Candidacy

In addition to the general requirements for admission to degree candidacy for health sciences programs, students applying to the program must have satisfac-

torily completed 60 credit hours of general curriculum requirements at an accredited college or university, including 6 hours each of English composition, mathematics, and physics; and 3 hours each of anatomy, physiology, psychology and social sciences or humanities. Applicants to the medical imaging track must also have 6 hours of chemistry. A personal interview is required.

Students may receive up to 48 hours of credit applicable toward fulfillment of the general curriculum requirements listed above if they have completed an approved program in diagnostic radiology, nuclear medicine technology, radiation therapy technology, or diagnostic medical sonography and are currently registered or will be registered during the first semester of study at The George Washington University.

Degree Requirements

In addition to the general curriculum requirements listed above, the program requires satisfactory completion of 63 credit hours in the major, consisting of 15 credit hours of health sciences core courses and 48 hours in a track listed below.

Diagnostic Medical Imaging track—Rad 100, 112–15, 141, 142, 143, 144, 145, 146, 147–48, 161, 162, 190, 192; and 6 hours of electives selected in consultation with the faculty advisor.

Radiation Therapy track—Rad 100, 107–10, 130–31, 132–34, 135, 136, 137, 160, 161, 162, 192; and 3 hours of electives selected in consultation with the faculty advisor.

The Master of Science in Health Sciences

Physician Assistant Program

Admission Requirements

Applicants for the Master of Science in Health Sciences degree must submit a complete health sciences application packet. One recommendation form may be completed by a supervisor or faculty advisor, and the second should be completed by a health professional familiar with the applicant's patient care experience. Applicants without a previous graduate degree from an accredited institution of higher education must submit official scores from the Graduate Record Examination (GRE); the Medical College Admission Test (MCAT) is not acceptable.

Applicants must hold a bachelor's degree from an accredited college or university and have completed the following minimum prerequisites with a grade of *B*− or better: two semesters of chemistry for science majors (biochemistry or organic chemistry required); two semesters of biological sciences for science majors (human anatomy and physiology strongly recommended; botany not acceptable); and two semesters of psychology (general and abnormal psychology are recommended). Preference is given to applicants who have considerable direct patient care experience, and the most competitive applicants have completed many additional upper-level science courses. The admissions committee invites the most promising candidates to come for personal interviews.

Transfer of Credit

Up to 6 credit hours of course work may be accepted as transfer credit provided the course work was completed within the past three years at an accredited college or university; the course work was taken for graduate credit; and the student earned a grade of *B* or better in the course.

Degree Requirements

The Physician Assistant Program can be undertaken on a full-time basis only. Students must satisfactorily complete a total of 78 credit hours of course work (48 credit hours of didactic phase course work and 30 credit hours of clinical phase course work). The course work is listed below.

Didactic Phase (48 credit hours)

Basic science curriculum—Anat 215; Bioc 211; Micr 228; Path 229, 252; Phyl 211.

Clinical sciences—HCS 206, 225, 229, 234, 245, 246, 247, 248; Phar 207.

Other required courses—HCS 116, 219, 237; PubH 201, 202.

Optional course—HCS 215.

Clinical Phase (30 credit hours)

Clinical rotations—HCS 260, 263, 266, 269, 272, 275, 278, 298; two electives.

Clinical Research Practicum—HCS 274.

Joint Master of Science in Health Sciences and Master of Public Health Program

Applicants to the physician assistant program who are interested in public health and meet the admission requirements for both the M.S.H.S. and the Master of Public Health may be eligible to pursue a joint program. This three-year, 102-credit-hour program enables students to complete the M.P.H. track in community-oriented primary care in conjunction with the didactic course work and clinical requirements of the physician assistant program. The didactic portion of the M.S.H.S. and most M.P.H. courses are completed during the first two years, while the third year consists primarily of clinical rotations in a variety of health care settings.

Certificate Programs

In addition to degree programs in which a certificate is awarded along with the degree, the School of Medicine and Health Sciences offers certificate-only programs in health sciences. An undergraduate-level paramedic certificate is available, and at the post-baccalaureate level, certificate programs are offered in clinical laboratory science, obstetric sonography, radiation therapy, and vascular sonography. At the graduate level, the Post-Master's Nurse Practitioner Certificate program is available to M.S.N. graduates who plan advanced specialization as family nurse practitioners or adult nurse practitioners. Further information can be obtained from the Office of Recruitment and Admission, Health Sciences Programs, School of Medicine and Health Sciences, The George Washington University, Washington, D.C. 20037.

Courses of Instruction

Courses are subject to change. The University reserves the right to withdraw any course announced.

Distance education courses and programs in the health sciences are listed in the Student Handbook for Distance Education Programs at learn.gwumc.edu hscidist/sthndbk.pdf.

Full-time faculty members as of January 1998 are listed with their primary appointments under Faculty and Staff of Instruction. For lists of departmental faculty, see the School of Medicine and Health Sciences website, www.gwumc.edu

Explanation of Course Numbers and Symbols

Courses numbered 1–200 are for students in undergraduate health sciences programs. Courses numbered from 201 through the 800s are primarily for candidates for the M.D. and M.S.H.S. degrees.

A number in parentheses after the name of the course indicates the number of credit hours of credit that may be earned. Five credit hours of credit per four-week elective period are granted for all fourth-year courses in the M.D. program.

Elective clinical rotations for fourth-year M.D. students are listed by course number and title and are representative of offerings that change yearly. The location is indicated if it is other than the GW Hospital or Medical Faculty Associates. The course descriptions, which change frequently, are to be found in the annual publication on senior-year electives published by the School of Medicine and Health Sciences.

Key to Abbreviations

The following abbreviations are used for course designations.

Accy	Accountancy
AdSc	Administrative Sciences
AmSt	American Studies
Anat	Anatomy
Anes	Anesthesiology
Anth	Anthropology
ApSc	Applied Science
Arab	Arabic
Art	Art
ArTh	Art Therapy
Astr	Astronomy
Bioc	Biochemistry
BiSc	Biological Sciences
BmSc	Biomedical Sciences
Bios	Biostatistics
BAdm	Business Administration
Chem	Chemistry
Chin	Chinese
CE	Civil Engineering
Clas	Classical Studies
CSAS	Columbian School of Arts and Sciences
Comm	Communication
CpIS	Computational Sciences
CpMd	Computer Medicine
CSci	Computer Science
Cnsl	Counseling
Derm	Dermatology
Econ	Economics
Educ	Educational Leadership
EE	Electrical Engineering
EMda	Electronic Media
EMed	Emergency Medicine
EMgt	Engineering Management
EngS	Engineering Science
Engl	English
EFL	English as a Foreign Language
E&RP	Environmental and Resource Policy
Envr	Environmental Studies
Epid	Epidemiology
EMBA	Executive Master of Business Administration
ExSA	Exercise and Sport Activities
ExSc	Exercise Science
Fina	Finance
ForS	Forensic Sciences
Fren	French
Gnet	Genetics
Geob	Geobiology
Geog	Geography
Geol	Geology
Ger	German Language and Literature
Grek	Greek
HCS	Health Care Sciences
HSci	Health Sciences
HSMP	Health Services Management and Policy
Hebr	Hebrew
Hist	History
Honr	Honors
HRD	Human Resource Development
HmSc	Human Sciences
HmSr	Human Services
Hmn	Humanities
Idis	Interdisciplinary Courses

IAff International Affairs
IBus International Business
Ital Italian
Japn Japanese
Jour Journalism
Kor Korean
Latn Latin
Law Law
Ling Linguistics
Mgt Management Science
Mktg Marketing
MBAd Master of Business Administration
Math Mathematics
ME Mechanical Engineering
Med Medicine
Micr Microbiology
Onco Molecular and Cellular Oncology
MStd Museum Studies
Mus Music
NSc Naval Science
NSur Neurological Surgery
Neur Neurology
NeuS Neuroscience
Ob&G Obstetrics and Gynecology
OR Operations Research
Opht Ophthalmology
Orth Orthopaedic Surgery
Path Pathology
PStd Peace Studies
Peds Pediatrics
Phar Pharmacology
Phil Philosophy
Phys Physics
Phyl Physiology
PCm Political Communication
PMgt Political Management
PPsy Political Psychology
PSc Political Science
PsyD Professional Psychology
Pchi Psychiatry and Behavioral Sciences
Psyc Psychology
PAd Public Administration
PubH Public Health
PPol Public Policy
Rad Radiology
Rel Religion
Rom Romance Literatures
SMPA School of Media and Public Affairs
SLP Service–Learning Program
Slav Slavic Languages and Literatures
Soc Sociology
SocL Sociology Legal Assistant Program
Span Spanish
SpEd Special Education
SpHr Speech and Hearing
Stat Statistics
SMPP Strategic Management and Public Policy
Surg Surgery
TrEd Teacher Education
TCom Telecommunication
TrDa Theatre and Dance
TStd Tourism and Hospitality Management
Univ University
Urol Urology
Viet Vietnamese
WStu Women's Studies
Ydsh Yiddish

Anatomy and Cell Biology

R.J. Walsh *(Chair)*

210–11 **Gross Anatomy** (2 to 3)
Required for medical students

214 **Microscopic Anatomy** (3)
Required for medical students.

215 **Anatomy for Health Sciences Students** (4)
Gross structure of the human body, including musculoskeletal, nervous, endocrine, cardiovascular, respiratory, gastrointestinal, urinary, and reproductive systems. Laboratory work is limited to prosected specimens.

279 **Applied Regional Anatomy** (arr.)
Regional dissection, guided readings, weekly discussions.

284 **Applied Surface Anatomy and Radiology** (arr.)
Detailed study of anatomical structures accessible to examination in the living subject, normal radiology of the body.

291 **Special Projects in Anatomy** (arr.)
An independent study on an aspect of gross anatomy, developed between the student and the instructor.

501 **Didactic Anatomy** (3)
Development of a didactic program to include human developmental anatomy, microscopic anatomy, gross anatomy, and where appropriate, neuroanatomy. May also include interdepartmental study.

800 **Summer Remedial: Gross Anatomy** (6)
801 **Summer Remedial: Microscopic Anatomy** (3)
802 **Summer Remedial: Human Developmental Anatomy** (1)

Anesthesiology

M.J. Berrigan *(Interim Chair)*

211 **Diagnostic and Therapeutic Instrumentation** (2)
Introduction to diagnostic and therapeutic instrumentation used in critical care areas of the hospital, including the OR, ICU, CCU, and ICN. Methods of operation, problems, and new developments in instrumentation
212 **Anesthesiology Research Laboratory** (2)
Cardiovascular physiologic changes and measurements resulting from drugs, drug interactions, and anesthetic techniques. Placental transfer and fetal and maternal physiologic changes from toxic local anesthetic reactions. Limited enrollment. Second year only
302 **Required Anesthesiology** (3)
Required for senior medical students. Basic physiology and pharmacology as applied to cardiac, respiratory, obstetric, and renal changes incurred during anesthesia. Clinical applications are discussed and demonstrated
380 **Anesthesiology** (5)
382 **Neurosurgical Anesthesia** (arr.)
384 **Intensive Care Unit** (5)
385 **Critical Care Medicine** (arr.)
Walter Reed Army Medical Center
386 **Critical Care Medicine** (arr.)
390–92 **Extramural Anesthesiology Elective** (arr.)

Biochemistry and Molecular Biology

A.L. Goldstein *(Chair)*

101 **Chemistry for Health Sciences Students** (2)
For students in health sciences programs. Basic concepts of general and organic chemistry.
201 **Medical Biochemistry** (6)
Required for medical students. Lecture and laboratory, emphasis on basic principles and their relation to medicine
209 **Research Elective in Medical Biochemistry** (arr.)
211 **Biochemistry for Health Sciences Students** (3)
For students in health sciences programs. Basic concepts of biochemistry and their relation to health sciences
290–91 **Extramural Biochemistry Elective** (arr.)
501 **Issues in Clinical Nutrition** (3)
503 **Readings in Immunology** (3)
Directed readings in immunochemistry, immunobiology, tumor immunology, and basic and clinical cellular immunology. May be repeated for credit
800 **Summer Remedial: Biochemistry** (8)

Computer Medicine

390–91 **Extramural Computer Medicine Elective** (arr.)

Dermatology

V.I. Sulica *(Chair)*

380 **Dermatology Clinic** (arr.)
382 **Dermatology Clinic** (arr.)
Walter Reed Army Medical Center

386 **Private Office Practice** (arr.)
390–92 **Extramural Dermatology Elective** (arr.)

Emergency Medicine

R.F. Shesser *(Chair)*

11 **EMT/A Review** (2)
Review of information and skills for the emergency medical technician preparing to take a state recertification examination. Includes CPR certification, EOA, and MAST training. Prerequisite: current EMT-A certification and EMed 140 or equivalent.

12 **Preliminary Emergency Care** (2)
Classroom and laboratory instruction that follows the Department of Transportation's first-responder course guidelines. Topics include airway management, CPR, hemorrhage control, bandaging, and splinting. Upon successful completion of this course, the student is eligible to take a state first-responder certification examination.

13 **First-Responder Review** (2)
Review of information and skills for the first-responder preparing to take a state recertification examination. Includes CPR certification. Prerequisite: current first-responder certification and EMed 12 or equivalent.

20 **Management Communication Skills** (3)
Development of skills in report and proposal writing, record keeping, and oral presentation.

61 **Prehospital Advanced Life Support I** (5)
Role and responsibilities of the emergency medical technician-paramedic, including medical history and physical assessment techniques, pathophysiology, and management of shock, cardiac, respiratory, neurological, and gastrointestinal emergencies. Overview of emergency medical services communication systems. Students are assigned to work in local emergency departments and ride with area paramedics. Laboratory sessions in patient assessment, advanced airway management, defibrillation, intravenous techniques, and IM-SQ injections. Prerequisite: EMed 140 or equivalent and permission of program director.

62 **Prehospital Advanced Life Support II** (4)
Assessment and management of emergencies in obstetrics, gynecology, trauma, pediatrics, adolescent medicine, and geriatrics. Prerequisite: EMed 61 and permission of program director.

63 **Paramedic Skills I** (1)
Presentation of trauma management skills outlined in PHTLS/BTLS course. Prerequisite: permission of instructor.

64 **Paramedic Skills II** (1)
Presentation of cardiac emergency management skills outlined in the American Heart Association's ACLS course. Lecture and laboratory. Prerequisite: permission of instructor.

65 **Cardiac EMT Clinical Education** (2)
Students rotate through a variety of clinical sites, including cardiac and critical care units, operating rooms, renal dialysis departments, and mobile intensive care units. Prerequisite: permission of program director.

66 **Paramedic Clinical Education** (3)
Students rotate through a variety of clinical sites, including Ob/Gyn, pediatrics, emergency, and psychiatric units. Prerequisite: permission of program director.

68 **Arrhythmia Recognition for Emergency Clinicians** (1)
Fundamentals of electrocardiography and interpretation of basic ECG patterns. Common errors in taking and reading ECGs, with emphasis on identification of normal and abnormal wave patterns. Effects of drugs and electrolyte imbalance on ECG patterns.

80 **Current Trends and Practices in Prehospital Clinical Medicine** (1)
Based on a review of monthly video journals, covering such topics as patient assessment techniques, current treatment modalities, disaster medicine, legal issues, and controversies in EMS. Admission by permission of instructor.

99 **Medical Terminology** (0)
A self-paced program covering terminology, vocabulary, symbols, and abbreviations in medicine, hospital services, and prehospital medicine.

100 **EMS and the Health Care System** (3)
Organization and management of emergency medical services systems. Service delivery methods, the relationship of medical services to the overall health care system, and the roles of federal, state, and local governments and the private sector in delivery of emergency care. Prerequisite or concurrent registration: HSci 104.

101 **EMS Management** (3)
Principles of personnel management and processes that contribute to the effectiveness of an EMS organization. Topics include human resource management, resource allocation, and procurement policy. Prerequisite or concurrent registration: HSci 104 or permission of program director.

104 **Legal Aspects of Emergency Management** (3)
Legal issues in the delivery of emergency medical services, including abandonment, malpractice, negligence, patient consent, the Freedom of Information and Privacy Acts, the Good Samaritan law, protocol deviation, record keeping, patient refusal of services, and medical control. Emergency medicine legislation and recent court decisions. Prerequisite: HSci 103.

106 **Ethics in Emergency Management** (3)
Ethical issues pertaining to prehospital care and administrative practice. Topics include "do not resuscitate" orders; medical and religious conflicts; access to medical care; and the impaired provider. Prerequisite: permission of program director.

108 **Educational Planning and Assessment for Emergency Managers** (3)
Theories and principles of learning and teaching, including development of effective course objectives, lecture outlines, and examinations.

110–11 **Analysis of EMS Systems** (3–3)
Planning and evaluation of emergency medical services, using various analytical models to examine the components of an emergency medical services system. Prerequisite or corequisite: HSci 104; HSci 103 recommended.

113 **Marketing and Public Relations for EMS Managers** (3)
Principles of marketing and consumer behavior. EMS marketing research, pricing, and dealing with the public and media. Prerequisite: HSci 104 and EMed 101, or permission of program director.

114 **Financing Emergency Medical Services Systems** (3)
Designed to provide financial skills needed by managers of EMS systems. Budget planning, preparation, and control, billing and collections, third-party reimbursements; financial reports; financial aspects of grant preparation; responding to RFPs. Prerequisite: permission of program director.

118 **Emergency Management Information Systems** (3)
Introduction to the use and application of computers in emergency medical services. Basic programming concepts, comparison of computer-assisted systems, use of computers in inventory control, performance evaluation, and resource allocation. Prerequisite: permission of program director.

130–31 **Anatomy and Physiology for Prehospital Providers** (3–3)
Anatomy and physiology of the human body for prehospital emergency health care providers. Topographic anatomy, organization of the body, cells and tissues. Systems covered: cardiovascular, respiratory, lymphatic, genitourinary, nervous, musculoskeletal, integumentary, endocrine, digestive, and reproductive. Prerequisite: permission of program director.

134–35 **Pharmacology for Prehospital Providers** (2–2)
A general overview of pharmacology for prehospital providers. In addition to general pharmacological concepts, prehospital, over-the-counter, and physician prescribed drugs will be covered. Areas of emphasis include drugs that affect the following systems: cardiac, respiratory, genitourinary, immune, nervous, integumentary, endocrine, and digestive. Prerequisite: permission of program director.

140 **Prehospital Emergency Medicine I—EMT Basic** (4)
Subjects covered include patient assessment, basic airway management, bandaging, splinting, and extrication. Adult and pediatric emergency medicine topics are covered. CPR certification is required. Successful completion leads to eligibility to sit for the National Registry and State Emergency Medical Technician (EMT) certification examinations.

141 **Prehospital Emergency Medicine II** (5)
Roles and responsibilities of the EMT-paramedic, physical assessment, obtaining a medical history; management of cardiac, respiratory, shock, and renal emergencies. Laboratory sessions include advanced airway management, intravenous therapy, medication administration, and defibrillation. Includes certification in Advanced Cardiac Life Support. Prerequisite: permission of program director.

142 **Prehospital Emergency Medicine III** (4)
Topics include medical emergencies of the nervous, endocrine, gastrointestinal, and genitourinary systems. Also discussed will be obstetric and gynecological, pediatric, and behavioral emergencies. Includes certification in Basic Trauma Life Support and the Neonatal Resuscitation Program. Prerequisite: permission of program director.

143–44 **Prehospital Clinical Practicum** (3–3)
Under the direct supervision of a clinician preceptor, students rotate through a variety of patient care units. Prerequisite: permission of program director.

145 **Cardiology for Emergency Clinicians** (3)
Fundamentals of electrocardiology and interpretation of basic ECG patterns. Common errors in taking and reading ECGs, with emphasis on identification of normal and abnormal wave patterns. Effects of drugs and electrolytes on the heart. Disease of the heart and an overview of the technology for diagnosis and treatment of cardiovascular disease. Prerequisite: permission of program director.

146–47 **Topics in Prehospital Emergency Medicine** (1–1)
Advanced topics in prehospital emergency medicine, intensive care medicine, and tactical medicine. Prerequisite: permission of program director.

150 **Advanced Skills in Emergency Medicine** (1)
Advanced physician-extender skills for the paramedic. Skills include advanced assessment, suturing, casting, splinting, and critical care techniques. Students will be prepared for the evolving role paramedics are playing in the delivery of primary care in urban and rural communities. Prerequisite: permission of program director.

154 **Extrication and Rescue Techniques** (1)
Techniques used in gaining access to and evacuating the injured. Vehicular accident extrication, high-rise and water rescue, electrical emergencies, and use of ropes. Prerequisite: EMed 140 or permission of program director.

155 **Medical Management of Hazardous Material Incidents** (3)
Hazardous materials and their risks. Identification of hazardous materials and related problems, precautions in approaching the contaminated patient, protective clothing, decontamination, and management of selected hazards. Prerequisite: EMed 140.

159 **Prehospital Externship** (1)
Supervised field rotation on a mobile intensive care unit. Under the supervision of the preceptor, the student will assist in the care of patients in the prehospital setting. Prerequisite: permission of program director.

160 **Procurement Practices for EMS Managers** (3)
Principles and concepts affecting large and small procurement programs. Emphasis on procurement policy, bidding, and RFPs. Prerequisite: BAdm 52.

162 **Health and Safety Legislation** (3)
Survey of the methods used to develop health and safety legislation, including the roles of federal, state, and local governments. Implications of such legislation for industry, the medical community, and the public.

164 **Disaster Response Planning and Management** (3)
Planning for and management of multiple-casualty incidents in the prehospital and hospital environment, including development of response plans, triage, medical evacuation procedures, communications, roles of government and the private sector, terrorism, and medical care for mass gatherings. Prerequisite: permission of program director.

166 **Emergency Management Research Design** (3)
Basic principles and methods of EMS data collection, analysis, and reporting. A research project is required. Prerequisite: Stat 51.

170 **Strategic Planning in Emergency Management** (3)
Application of strategic planning concepts to EMS. Study of the strategic planning process as a series of interrelated analyses and decisions, including representative analytic methods used in the most critical stages. Discussion of the relationships among strategic planning, project planning, marketing, and financial planning.

172 **Ensuring Quality in EMS** (3)
Introduction to philosophies and tools for quality assurance and management managing the EMS quality assessment quality improvement program, designing surveys, and analyzing data. Prerequisite: permission of program director

180 **Leadership Skills** (3)
Development of leadership skills in listening, delegation of responsibilities, discipline, and decision making

181 **Integrated Emergency Management** (3)
Discussion of the roles of international, federal, state, and local agencies involved in disaster response planning and management. Development of a model for an emergency management system that integrates disaster response. Prerequisite or concurrent registration: EMed 164

190 **Special Topics in Emergency Medical Services** (3)
Course designed to focus on EMS topics of a current or topical nature. May be repeated for credit with approval of advisor. Prerequisite: permission of program director

196 **Case Studies in EMS Management** (3)
An integrated capstone course to develop skills in diagnosing EMS organizational problems, formulating and selecting strategic alternatives, and recognizing problems inherent in strategy implementation. Prerequisite: permission of program director

198 **Emergency Management Administrative Internship** (3 to 8)
The student is assigned to a local emergency medical service agency to assist in the administration of its health care delivery program. Opportunity to evaluate health care service delivery and to devise supervise protocols and regulations

199 **Independent Study** (3)
Individual research project in an area relevant to emergency medicine. For undergraduate seniors with permission of program faculty.

201 **Cardiopulmonary Resuscitation Practicum** (0)
Mechanical skills for providing basic cardiac life support (BCLS). Upon completion of EMed 201 and 230, the student receives BCLS certification

230 **Emergency Medicine I** (2)
Required course for first-year medical students. Lectures, demonstrations, and practice sessions on basic prehospital assessment and stabilization. Upon completion of EMed 201 and 230, the student receives BCLS certification

302 **Emergency Medicine** (3)
Required for senior medical students. Rotating clinical shifts in the emergency unit of the University Hospital under supervision of the faculty and residents of the Department of Emergency Medicine. Videotaped lectures, daily student conferences, and required readings. Two-week rotation with ten required clinical shifts. This course is prerequisite to all elective rotations in emergency medicine

312 **Emergency Medicine** (arr.)

313 **Emergency Medicine** (arr.)
Providence Hospital

340 **Emergency Medicine Research** (5)

350 **Wound Management** (arr.)

390–93 **Extramural Emergency Medicine Elective** (arr.)

502 **Clinical Toxicology** (arr.)

503 **Domestic Violence** (3)
Psychological, legal, and medical perspectives on the problem of domestic violence, including understanding the problem, approaches to screening and assessment, and effective interventions for victims, perpetrators, and their children

504 **Rapid and Effective Patient Communications** (3)

Health Care Sciences

L. G. Pawlson *(Chair)*

100 **Clinical Medicine Review** (5)
For students in the physician assistant program who fail to meet the minimum scholarship requirement in the core curriculum by the end of the clinical year. Prerequisite: permission of program director

102 **Food and Water Sanitation** (3)
General characteristics of urban and rural water systems: treatment and distribution; public bathing place sanitation; design and function of water treatment facilities. Dairy products and food sanitation: processing, storing, and distributing food. Supervision and training of food industry personnel.

103 **Academic Curriculum Tutorial** (arr.)
For students in the physician assistant program who fail to meet the requirement for satisfactory performance in one or more subject areas in the first-year curriculum. Prerequisite: permission of program director.

116 **Medical Terminology** (0)
Autotutorial completed before entering the physician assistant program. Terminology and vocabulary basic to all areas of medical science, hospital service, and health sciences specialties.

150 **Topics in Geriatrics for Physician Assistants** (1)
A functional assessment approach to care of the elderly patient.

151 **Clinical Pharmacology** (arr.)
Appropriate uses of medication and various treatment modalities. Dosages, actions, routes of administration, indications, and contraindications. Advantages, disadvantages, and reasons for selecting the drug of choice or an alternative.

158 **Cardiothoracic Medicine Elective for Physician Assistants** (4)
Elective four-week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.

159 **Dermatology Elective for Physician Assistants** (4)
Elective four week clinical rotation selected with faculty approval. Under the supervision of the preceptor students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.

160 **Medical Inpatient** (5)
Six-week rotation in which the student learns to collect and integrate information on the medical problems of patients who have been admitted to the hospital. The student is part of a medical team under the supervision of the medical resident or attending physician and is on regular call. Attendance is required at all work rounds, lectures, and conferences.

163 **Medical Outpatient** (5)
Six-week rotation in which the student learns to collect and integrate information on the various medical problems encountered in the ambulatory setting, such as an outpatient clinic, an HMO, or a community health center. Emphasis on differential diagnosis, patient management, and preventive medicine. The student is part of a health care team under a physician's supervision.

166 **Surgical Inpatient** (5)
Six-week rotation in which the student learns to collect and integrate information on admitted surgical patients and gains experience in their pre- and post-operative management. Students assist during operative and ward procedures and function as part of the surgical team under a physician's supervision.

169 **Obstetrics and Gynecology** (5)
Six week rotation in which the student learns to collect and integrate information on obstetrical and gynecological patients. Students assist in outpatient gynecological and inpatient obstetrical practice as part of the health care team under a physician's supervision.

172 **Pediatric Outpatient** (5)
Six week rotation in which the student learns to collect and integrate information about the medical problems of the pediatric outpatient under the direction of a pediatrician. Normal growth and development, pediatric history and physical examination, and management of common pediatric illnesses.

173 **Special Projects Elective for PA/MPH Students** (4)
Elective preceptorship practicum experience for students in the combined Physician Assistant-Master of Public Health Program. With faculty approval and preceptor supervision, students select and complete a project spanning clinical and/or research activities, special emphasis on public health and preventive medicine.

175 **Primary Care Preceptorship** (arr.)
Seven-week experience in which the student functions as a physician assistant in a primary care setting. Appropriate primary care areas include pediatrics, internal medicine, family practice, and emergency medicine.

176 **Emergency Medicine Elective for Physician Assistants** (4)
Elective four-week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.

177 **General Medicine Elective for Physician Assistants** (4)
Elective four-week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.

178 **Emergency Medicine** (5)
Rotation in which the student learns to collect and integrate information on patients in an emergency room. Experience with a variety of emergency situations through rotating shifts. The student functions as part of the emergency medical team under the supervision of a physician.

180 **Practicum in Environmental Health** (arr.)
Supervised fieldwork. Food service, housing, water, sewage and solid waste, and infectious diseases. Occupational health problems. Reports and conferences.

186 **Orthopaedics Elective for Physician Assistants** (4)
Elective four-week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.

187 **Radiology Elective for Physician Assistants** (4)
Elective four-week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.

188 **Shock Trauma Elective for Physician Assistants** (4)
Elective four-week clinical rotation selected with faculty approval. Under the supervision of the preceptor, students assist in the care of patients with problems commonly seen in this specialty and learn to collect and integrate information on these patients.

194 **Practicum in Gerontology and Geriatric Care** (arr.)
Supervised fieldwork with the elderly or in administration and planning for the elderly. Offered in cooperation with other schools and departments of the University. For medical students and for undergraduate and graduate students in the social sciences and health services administration.

196 **Issues in American Health Care** (arr.)
Fieldwork combined with academic study of the health care system and its problems: cost, quality of care, delivery of care, ethical issues, health education, consumer issues. Field placements (12 to 20 hours per week) in appropriate health-related activities. Admission by permission of instructor. Undergraduate students only.

197 **Current Issues in Bioethics** (1)
Interdisciplinary approach to problems of bioethics. Presentations by physicians, nurses, lawyers, economists, philosophers, and health care administrators.

198 **Psychiatry** (4)
Four-week rotation in which the student learns to collect and integrate information on psychiatric patients. The student is part of the therapeutic community and assists in identification and treatment of the psychiatric patient.

199 **Independent Study** (arr.)
Required rotation in an area of study chosen by the student and approved by the faculty. Students develop learning objectives in conjunction with their faculty advisors.

201 **Practicum in Geriatric Care** (1)
Geriatric assessment, including interviewing, physical exam, and functional assessment in outpatient and institutional settings. Participation in home visits and interdisciplinary seminars.

205 **Diagnosis and Management of Health Deviations** (5)
Common health deviations of adults, with emphasis on the normal physiological and pathophysiological aspects of systems functioning. The systematic assessment and management of health deviations that form the foundation of clinical decision making for adult/family nurse practitioners in primary care. For students in the post-master's nurse practitioner certificate program and in the graduate program in primary care nursing offered in collaboration with George Mason University College of Nursing and Health Science

206 **Clinical Decision Making** (2)
Methodological approach to clinical problem solving, with emphasis on interpretation of patient histories, physical examinations, laboratory results, and radiographs. Selection of appropriate pharmacological and nonpharmacological therapies, patient education, counseling, and referral. Students assist in analysis of clinical cases under faculty supervision and learn to evaluate symptoms in relation to pathophysiological changes. For students in the post-master's nurse practitioner certificate program, the graduate program in primary care nursing offered in collaboration with George Mason University College of Nursing and Health Sciences, and the graduate physician assistant program

207 **Practicum in Advanced Health Assessment** (1)
Application of advanced health-assessment and clinical decision-making skills, with emphasis on the collection of data needed to make a comprehensive health assessment. Students work with adult patients in primary care settings under faculty supervision. For students in the post-master's nurse practitioner certificate program and in the graduate program in primary care nursing offered in collaboration with George Mason University College of Nursing and Health Sciences

208 **Clinical Experience in Urban Health Care** (1)
An introduction to the clinical environment for increased awareness of health care issues. Students take part in a variety of clinical activities, including venopuncture, laboratory work, and history taking in an urban clinic for medically underserved individuals.

209 **Adult Primary Care Preceptorship** (4)
Integrates clinical preceptorships and seminars for the required 450 hours of supervision in the clinical setting. Analysis of the scope of the nurse practitioner's role in the management of adult primary care. The student assumes progressively increased responsibility in the delivery of primary care, with a focus on vulnerable populations. For students in the post-master's nurse practitioner certificate program.

210–11 **Family Primary Care I–II** (3–3)
Seminar and clinical practicum to develop advanced clinical decision-making skills, integrating the role of the family nurse practitioner. Family primary care problems throughout the lifespan are assessed and managed within the context of the community, with an emphasis on health promotion and disease prevention strategies with medically underserved adults, childbearing and childrearing families, and families with geriatric members. For students in the post-master's nurse practitioner certificate program

212 **Primary Care of the Developing Family** (2)
The application of advanced decision-making skills to health assessment, health maintenance/promotion, anticipatory guidance, diagnosis, and management of common primary care health concerns. Seminar and clinical practicum (200 clinical hours) focused on community-based childbearing and childrearing families. For students in the post-master's nurse practitioner certificate program

213 **Advanced Family Primary Care** (2)
Seminar and clinical practicum (200 clinical hours) focused on the integration of the family nurse practitioner role through the application of family theory and concepts in primary care settings. For students in the post-master's nurse practitioner certificate program

214 **Assessment and Management of the Developing Family** (3)
Didactic and laboratory course focused on primary care needs of childbearing and childrearing families. Includes health assessment, health maintenance promotion, anticipatory guidance, and diagnosis and management of common primary care health concerns. For students in the post-master's nurse practitioner certificate program

215 **Community Service Curriculum** (3)
Designed to introduce the student to community-based services in the Washington metropolitan area. Students participate at selected sites, for five to eight hours per month, over the last five semesters of the program.

219 **The Role of the Physician Assistant in American Health Care** (2)
The history, development, and current status of the physician assistant profession within the context of the U.S. health system. Provides entering physician assistant students with a knowledge of practice roles and legal and economic aspects of the profession.

225 **Manifestations of Disease** (5)
Interdisciplinary course in the theory of medicine using an organ system approach. Clinical findings and pathophysiology for a wide spectrum of diseases. Diagnosis and management of diseases in a variety of medical and surgical specialties. Prerequisite: Anat 215, Phyl 211.

229 **Human Behavior** (2)
Basic knowledge of psychiatry needed to enter clinical work. Mental status examination as a tool of clinical assessment. Approaches to understanding and working with psychiatric patients.

232 **Studying a Study: Evaluating the Medical Literature** (1)
Required course for first-year medical students. Principles of analyzing medical journal articles, with emphasis on nonmathematical epidemiology and biostatistical principles and illustrations of errors that can occur in research articles.

233 **Epidemiology and Medical Decision Making** (1)
Required course for second-year medical students. Principles of epidemiology and diagnostic testing. Rates of disease, assessment of risk and disease causation and concepts of reproducibility, range of normal, sensitivity, and specificity. Case studies in epidemiology and introduction to diagnostic decision analysis.

234 **Clinical Assessment** (2 or 3)
Patient interviewing and physical examination, including integration of data obtained from the newer and more sophisticated modes of diagnostic technology.

237 **Clinical Ethics for Health Sciences Students** (1)
Practitioner–patient interaction and the roles of law, ethics, economics, and government in the health care system.

245 **Introduction to Primary Care** (3)
Principles of primary care medicine presented as the common health problems seen through various stages of life. Focus is on health promotion, disease prevention, screening, patient education, and counseling.

246 **Topics in Emergency Medicine for Physician Assistants** (arr.)
Evaluation and treatment of the patient with an urgent problem. Review of signs and symptoms, accompanying physical findings, and methods for diagnosis and treatment of a spectrum of emergent illnesses. Development of skills used in the clinical year, including suturing, gowning and gloving, CPR and ACLS certification, cast application, intubation, and catheterization.

247 **Introduction to Radiology** (1 or 2)
Principles and language of radiologic imaging. Radiologic anatomy. Development of a systematic approach to radiology. Normal and abnormal radiological findings.

248 **Introduction to Electrocardiography** (1)
Fundamentals of electrocardiography and interpretation of basic ECG patterns. Common errors in taking and reading ECGs, with emphasis on identification of normal and abnormal wave patterns. Effects of drugs and electrolyte imbalance on ECG patterns.

260 **Inpatient Medicine Clinical Practicum** (3)
Required for second-year graduate PA students. Six-week rotation in which students learn to collect and integrate information on patients admitted to an inpatient hospital setting. Supervision is provided by staff physicians and PAs. Students are required to attend graduate seminars relating to inpatient medicine problems at the end of the six-week period.

263 **Ambulatory Care Clinical Practicum** (3)
Required for second-year graduate PA students. Six-week rotation in which students learn to collect and integrate information presented by patients in an ambulatory care setting. Diagnosis and treatment plans are developed under the supervision of attending physicians and PAs. Clinics are in a variety of settings

e.g., urban, rural, HMOs, etc. Students are required to attend graduate seminars relating to outpatient medicine problems at the end of the six week period.

266 **Surgical Inpatient Clinical Practicum** (3)
Required for second-year graduate PA students. Six-week rotation in which students are introduced to the care and management of the hospitalized surgical patient. Under the supervision of the attending physician or PA, students learn to diagnose surgical conditions, assist in surgery, and manage pre- and postoperative patients. Students are required to attend graduate seminars relating to surgery at the end of the six-week period.

269 **Obstetrics and Gynecology Clinical Practicum** (3)
Required for second-year graduate PA students. Six-week rotation in which students are introduced to the care and management of the hospitalized gynecologic patient, including clinics, surgery, and ward work. Under the supervision of the physicians and PAs, students learn to collect and integrate information and develop an appropriate treatment plan. Students are required to attend graduate seminars relating to obstetrics and gynecology at the end of the six-week period.

272 **Pediatrics Clinical Practicum** (3)
Required for second-year graduate PA students. Six-week rotation in which students work either in an inpatient or outpatient setting. Students learn to recognize, diagnose, and treat common pediatric problems, as well as perform physical examinations. Supervision is provided by physicians and PAs. Students are required to attend graduate seminars relating to pediatrics at the end of the six-week period.

274 **Graduate Clinical Practicum** (3)
For students in graduate-level PA program. Combined clinical research experience, correlating with completion of course work.

275 **Primary Care Preceptorship Clinical Practicum** (5)
Required rotation for all PA students in the graduate-level program. Students choose site, with faculty approval, for this capstone course prior to graduation. Seven-week rotation.

276 **Emergency Medicine Elective for Graduate PA Students** (1)
Elective four-week rotation selected with faculty approval. Students work under the supervision of attending physician or PA and learn to collect and integrate information on patients typically seen in this area of medicine. Research paper required at completion of rotation.

277 **General Medicine Elective for Graduate PA Students** (1)
Elective four-week rotation selected with faculty approval. Students work under the supervision of attending physician or PA and learn to collect and integrate information on patients typically seen in this area of medicine. Research paper required at completion of rotation.

278 **Emergency Medicine Clinical Practicum** (3)
Required for second-year graduate PA students. Six-week rotation in which students learn to assess emergent medical problems. Under the supervision of the attending physician or PA, students develop a differential diagnosis management plan, including appropriate laboratory and radiologic tests. Students are required to attend graduate seminars in emergency medicine at the end of the six-week period.

280 **Cardiothoracic Medicine Elective for Graduate PA Students** (1)
Elective four-week rotation selected with faculty approval. Students work under the supervision of attending physician or PA and learn to collect and integrate information on patients typically seen in this area of medicine. Research paper required at completion of rotation.

281 **Dermatology Elective for Graduate PA Students** (1)
Elective four-week rotation selected with faculty approval. Students work under the supervision of attending physician or PA and learn to collect and integrate information on patients typically seen in this area of medicine. Research paper required at completion of rotation.

286 **Orthopaedic Elective for Graduate PA Students** (1)
Elective four-week rotation selected with faculty approval. Students work under the supervision of attending physician or PA and learn to collect and integrate information on patients typically seen in this area of medicine. Research paper required at completion of rotation.

287 **Radiology Elective for Graduate PA Students** (1)
Elective four-week rotation selected with faculty approval. Students work under the supervision of attending physician or PA and learn to collect and integrate information on patients typically seen in this area of medicine. Research paper required at completion of rotation.

288 **Shock Trauma Elective for Graduate PA Students** (1)
Elective four-week rotation selected with faculty approval. Students work under the supervision of attending physician or PA and learn to collect and integrate information on patients typically seen in this area of medicine. Research paper required at completion of rotation

298 **Psychiatry Clinical Practicum** (2)
Required for second-year graduate PA students. Four-week rotation in which students participate in the assessment and management of patients in an inpatient or outpatient therapeutic setting. Supervision is provided by attending physicians and PAs. Students are required to attend graduate seminars in psychiatry at the end of the four-week period

299 **Independent Study for Graduate PA Students** (arr.)
Clinical rotation chosen as an elective by the student, with faculty approval. Learning objectives are developed by students and reviewed by faculty prior to the start of the rotation. Research paper required at completion of rotation.

301 **Clerkship in Primary Care** (8)
Required for third-year medical students. Care of patients in ambulatory settings including the George Washington University Health Plan (HMO), emergency room, and office practices of internists, pediatricians, and family practitioners. Emphasis on specialty areas that contribute to a physician's capacity to care for common minor illnesses: orthopaedics, otolaryngology, dermatology, and ophthalmology. Participation with District of Columbia Fire Department in responding to ambulance calls. Six-week elective periods throughout the academic year

350 **Ambulatory Health Care Research** (arr.)

360 **Family Practice Preceptorship** (arr.)

361 **Rural Family Practice Preceptorship** (arr.)
Garrett County, Maryland, Medical Center

362 **Rural Family Practice Preceptorship** (arr.)
Somersville, West Virginia, Hospital Family Practice Center

363 **Geriatric Medicine** (arr.)
Clinical experience at a congregate housing facility, long-term care facility, outpatient practice, hospice, hospital, and home visits. Opportunity to supplement experience with activity at senior centers and day care facilities

390–94 **Extramural Health Care Sciences Elective** (arr.)

398 **Advanced Clinical Experience in Primary Care** (arr.)

399 **Supervised Experience in Ambulatory Health Care** (5)

400 **Medical Decision Making** (2)
Required course for all medical students. Principles of decision making and preventive medicine based on analysis of rates of disease, risk factors, causation, cost-effectiveness analysis, and decision analysis. Students choose in-depth case studies that illustrate principles of vaccine use, occupational–environmental health, or screening and prevention of complications of existing diseases

502 **Organization and Financing of Health Care** (3)
Structural and financial factors that shape health care delivery in the United States, with emphasis on the organizational provider, although the role of the individual provider is also addressed.

504 **Medical Law for the Attending Physician** (3)
Legal attempts to define professional conduct under varying clinical circumstances. Study of landmark cases and of the process used in the judicial system to analyze the reasonableness of professional conduct

Health Sciences

101 **Psychosocial Aspects of Health and Illness** (3)
Comprehensive introduction to the psychological and social aspects of health and wellness, including social foundations of behavior and psychological theories related to health and the impact of illnesses on patients, families, and communi-

ties. Emphasis on the development of communication skills and the establishment of caring relationships.

102 **Pathophysiology** (3)
Biomedical and scientific framework for the understanding of human disease mechanisms and biologic processes. Lecture presentations cover infectious, immunologic, cardiovascular, genetic, respiratory, gastrointestinal, neoplastic, reproductive, renal, hematologic, neurologic, and musculoskeletal diseases.

103 **Health Policy and the Health Care System** (3)
Incorporates economic theory and policy analysis methodology to analyze the impact of changes in the health care system on the practice of health sciences professionals and the quality and process of health care. The role of state and federal legislation will be explored, and critical aspects of the U.S. health system are compared to those of other countries.

104 **Management of Health Science Services** (3)
Application of management and organizational principles to the delivery of services provided by health sciences disciplines. Issues addressed include information systems, leadership, team building, fiscal management, human resources management, quality improvement, and management of conflict and change.

Interdisciplinary Courses

201 **Seminar for Special Program Students** (arr.)
An elective for students in the first year of the Doctor of Medicine special program. Concentration on learning strategies to develop individual strengths. May be repeated for credit.

209 **Independent Study** (arr.)

210–11 **The Practice of Medicine** (3 to 5)
The first part of a four-year, ongoing program established to develop the intellectual and procedural skills required of a physician. Students meet in small groups led by faculty mentors to learn the technical skills of interviewing and physical examination and to explore a range of philosophical and ethical issues on the relationship between doctor and patient. Each student is assigned to the office of a primary care and physician–preceptor to observe patient care and practice clinical skills.

212 **Neurobiology** (3)
Same as Anat/Phyl 212. Integrated survey of the structure and function of the human nervous system. Lecture, clinical demonstration, and laboratory.

215 **Cells and Tissue** (arr.)
Required for first-year medical students.

220–21 **The Practice of Medicine** (arr.)
A continuation of small-group mentored sessions and the office based primary care preceptorship. Students learn higher-level interviewing skills and refine their physical diagnostic skills, concentrating on the recognition of abnormal findings. Clinical assessment sessions are closely tied to the content of Idis 301–2. Additional issues pertain to the doctor–patient relationship and the evolution of the student into a physician.

230–31 **The Practice of Medicine** (2–2)
The third year of The Practice of Medicine reconsiders basic scientific concepts presented in the first two years of the program in the context of patient care and introduces more advanced basic science theory. The course considers clinical ethics and epidemiology as well as further exploration of the socialization of the physician.

301–2 **Introduction to Clinical Medicine** (8–8)
One-year course. Integrated, organ-oriented course, with emphasis on physical diagnosis. Basic instruction in child health and development, clinical problem solving, dermatology, gynecology, internal medicine (including subspecialties), neurology, obstetrics, ophthalmology, psychiatry, radiology, and urology. Experience in hospital-based physical diagnosis and history taking.

350 **International Medical Experience in Third-World Service** (arr.)

351 **Clinician as Medical Educator** (3)
Effective teaching techniques in the clinical setting, including evaluation and feedback to learners. Student gains practical teaching experience by serving as a teaching assistant for a first- or second-year Practice of Medicine mentor group.

providing instruction in diagnosis and interviewing and serving as standardized patients in performance-based examinations.

800 **Summer Remedial: Clinical Medicine** (16)
801 **Summer Remedial: Neurobiology** (3)
803 **Summer Remedial: Practice of Medicine I** (arr.)
804 **Summer Remedial: Practice of Medicine II** (arr.)

Medicine

A.G. Wasserman *(Chair)*

280 **Issues in International Health and Development** (arr.)
Examination and analysis of a specific issue, problem, or policy in international health and development. Issues are chosen by the faculty based on current global priorities. Prerequisite: PubH 270 or permission of instructor.

281 **Advanced Reading or Research in International Health and Development** (arr.)
In-depth examination of a topic in international health and development under faculty guidance. Prerequisite: PubH 270 or permission of instructor, prior to registering for the course, students must present a one-page proposal of their chosen topic for approval by the faculty.

282 **Practicum in International Health and Development** (3)
Internship in an international organization with a mentor in international health and development and under the guidance of a faculty advisor. Students participate in and contribute to ongoing projects and activities of the sponsoring organization. A commitment of 12–15 hours on-site per week is required. Prerequisite: Permission of instructor, students must complete a course application prior to registering for the course.

305 **Inpatient Clerkship** (10)
Required for third-year medical students. Comprehensive study of patients: history and physical examination; ward rounds, consultations, conferences, preceptorial teaching, seminars. V.A. and University Hospitals and Washington Hospital Center. Eight-week periods throughout the academic year.

331 **Hematology/Oncology** (arr.)
332 **Acting Internship in Medicine** (5)
Washington Hospital Center.
334 **Acting Internship in Medicine** (5)
V.A. Medical Center.
336 **Medical Intensive Care** (5)
Washington Hospital Center.
337 **Senior Clerkship** (5)
Providence Hospital.
338 **Occupational and Environmental Medicine** (arr.)
Washington Occupational Health Associates.
339 **Occupational and Environmental Medicine** (arr.)
340 **Electrocardiography** (arr.)
347 **NIH/NIRID Consult Service** (arr.)
348 **Infectious Disease** (5)
National Naval Medical Center.
349 **Infectious Disease** (5)
Washington Hospital Center.
350 **Infectious Disease** (arr.)
V.A. Medical Center.
351 **Infectious Disease** (arr.)
352 **Cardiology** (5)
354 **Cardiology** (5)
356 **Cardiology** (arr.)
Providence Hospital.
358 **Cardiology** (5)
Washington Hospital Center.
359 **Cardiology** (5)
Washington Hospital Center.
360 **Cardiology** (5)
V.A. Medical Center.

363 **Medical Intensive Care and Coronary Care Unit** (5)
V.A. Medical Center.
364 **Critical Care Medicine** (arr.)
370 **Endocrinology** (arr.)
Providence Hospital.
372 **Endocrinology and Diabetes** (arr.)
373 **Endocrinology and Metabolism** (arr.)
V.A. Medical Center.
375 **Endocrinology Research** (arr.)
V.A. Medical Center.
390–95 **Extramural Internal Medicine Elective** (arr.)
403 **Oncology** (arr.)
V.A. Medical Center.
405 **Oncology** (arr.)
Washington Hospital Center. Interdisciplinary conferences with V.A Medical Center staff.
411 **Gastroenterology/Cardiology/Pulmonary Medicine** (5)
413 **Gastroenterology** (5)
414 **Gastroenterology** (arr.)
V.A. Medical Center.
415 **Gastroenterology** (arr.)
Washington Hospital Center
416 **Gastroenterology** (arr.)
D.C. General Hospital
417 **Gastroenterology** (arr.)
Walter Reed Army Medical Center
418 **Gastroenterology** (arr.)
National Naval Medical Center.
419 **Gastroenterology** (arr.)
Providence Hospital
423 **Gastroenterology** (5)
430 **Hematology** (arr.)
V.A. Medical Center.
431 **Hematology/Oncology** (arr.)
434 **Hematology/Oncology** (arr.)
Providence Hospital.
436 **Hematology Research** (arr.)
V.A. Medical Center
440 **Pulmonary Medicine** (arr.)
V.A. Medical Center.
442 **Pulmonary Medicine** (5)
Washington Hospital Center.
447 **Pulmonary Medicine** (5)
451 **Rheumatology** (5)
453 **Arthritis** (arr.)
Washington Hospital Center.
454 **Pediatric Rheumatology and Orthopaedics** (arr.)
Children's National Medical Center.
455 **Physical Medicine and Rehabilitation** (arr.)
456 **Physical Medicine and Rehabilitation** (arr.)
Holy Cross Hospital.
460 **Renal Medicine** (arr.)
Washington Hospital Center.
461 **Renal Medicine** (5)
463 **Diagnostic Laboratory Immunology** (5)
465 **Renal Medicine** (5)
Private office practice and hospital consultations
469 **Renal Medicine** (arr.)
V.A. Medical Center.
471 **Allergy Clinic** (arr.)
Walter Reed Army Medical Center.
472 **Private Office Practice: Allergy Clinic** (3)
Combined elective with allergy clinic at University Hospital, Walter Reed, and NIH

494 **Cancer Epidemiology** (arr.)
NIH
499 **Electrocardiography** (1)
501 **Immunopathogenesis** (3)
502 **Nutrition** (3)
503 **Renal Physiology** (3)
506 **International Health** (arr.)

Microbiology and Immunology

J.H. Grossman *(Acting Chair)*

201 **Interdisciplinary Medical Microbiology** (5)
Provides an interdisciplinary approach to the study of infectious organisms and associated diseases by combining aspects of fundamental microbiology, infectious disease, pharmacology, and pathology.

202 **Immunology** (2)
The structure and function of the immune system in health and disease, with emphasis on human immunobiology. Topics include humoral and cellular immune responses, immunological tolerance and memory, resistance to microbial pathogens, inflammation and allergic disorders, histocompatibility and transplantation, immunity to tumors, and autoimmune and immunodeficiency diseases. Required course for first-year medical students

228 **Selected Topics in Microbiology for Health Sciences Students** (2)
Fundamental principles and clinical correlations of microbiology and microbial defense

800 **Summer Remedial: Microbiology** (8)

Neurological Surgery

L.N. Sekhar *(Chair)*

302 **Clinical Clerkship in Neurosurgery** (3)
Introduction to neurosurgery, emphasizing the neurological examination, diagnosis, and rudiments of treatment. Fulfills the neuroscience course requirement

380 **Neurosurgery** (5)
382 **Neurosurgery** (5)
National Naval Medical Center
383 **Pediatric Neurosurgery** (arr.)
Children's National Medical Center
387 **Neurosurgery** (arr.)
Washington Hospital Center
390–92 **Extramural Neurosurgery Elective** (arr.)

Neurology

J.J. Kelly *(Chair)*

380 **Clinical Neurology** (arr.)
Expertise in performing the neurological examination taught through work-up of new hospital and clinical patients, with emphasis on the anatomical localization of neurological symptomatology. Introduction to differential diagnosis. Familiarization with indications for neurological procedures (CT scanning, arteriography, myelography, evoked potentials, and EEG). Lecture series reviews the basic categories of neurological diseases

384 **Clinical Neurology** (arr.)
Washington Hospital Center
390–94 **Extramural Neurology Elective** (arr.)
395 **Neurology Research** (arr.)
Washington Hospital Center

Obstetrics and Gynecology

J.W. Larsen *(Interim Chair)*

303 **Clinical Obstetrics and Gynecology** (10)
Required for medical students. Participation in all obstetrical and gynecological clinics, daily departmental conferences, and ward rounds. Eight-week periods throughout the academic year. University, Fairfax, and Holy Cross Hospitals.
377 **Cytogenetics and Prenatal Diagnosis of Birth Defects** (arr.)
378 **Reproductive Endocrinology and Infertility** (arr.)
379 **Clinical Obstetrics and Gynecology** (arr.)
Alexandria Hospital.
380 **Clinical Obstetrics and Gynecology** (arr.)
Alexandria Hospital.
381 **Perinatal Medicine** (arr.)
382 **Gynecologic Oncology** (5)
390–95 **Extramural Obstetrics and Gynecology Elective** (arr.)

Ophthalmology

J.S. Zacharia *(Acting Chair)*

381 **Clinical Ophthalmology** (arr.)
Examination, diagnosis, and management of a wide variety of ocular conditions in ambulatory patients. Emphasis on conducting a general ophthalmic examination, recognition of abnormal findings, and management of common ocular diseases. Lectures, rounds, and seminars.
382 **Clinical Ophthalmology** (arr.)
National Naval Medical Center
384 **Clinical Ophthalmology** (arr.)
Martinsburg V.A. Hospital
385 **Private Office Practice** (arr.)
391–92 **Extramural Ophthalmology Elective** (arr.)

Orthopaedic Surgery

R.J. Neviaser *(Chair)*

302 **Clerkship in Orthopaedic Surgery** (3)
Basic clinical rotation that will partially fulfill the surgical subspecialty requirement. Didactic sessions on physical diagnosis, X-ray interpretation, arthritis, trauma, and reconstructive surgery. Ward rounds, periods in emergency room or operating room, conferences. All affiliated hospitals.
380 **Orthopaedic Surgery** (5)
390–93 **Extramural Orthopaedic Surgery Elective** (arr.)

Pathology

A. Sidransky *(Chair)*

Courses numbered 121 to 126, 130 to 135, and 140 are open only to students in the clinical year of the clinical laboratory science program. Path 121 is prerequisite to all other courses in the clinical year of the clinical laboratory science program.

118 **Introduction to Clinical Laboratory Science** (3)
Introduction to the clinical laboratory with an emphasis on the role of the clinical laboratory scientist. Theory and performance of basic laboratory techniques. Lectures, demonstration, and laboratory.
119 **Immunology: Introduction to Immunologic Fundamentals** (3)
Lecture course for clinical laboratory science students, open to others. Fundamental immunologic concepts. Serologic and immunologic procedures as applied

to clinical and research situations. Prerequisites: BiSc 137 and Chem 151–54, or permission of instructor

121 **Urinalysis and Body Fluids** (1)
Evaluation of urine and other body fluids for the presence of disease, clinical correlations. Lectures and laboratory.

122 **Clinical Chemistry** (4)
Principles and procedures involved in chemistry analysis of human blood and body fluids. Clinical correlations and pathological aspects of human disease. Lectures and laboratory

123 **Clinical Microbiology** (4)
Principles of clinical microbiology, with emphasis on pathogenic characteristics, isolation, and identification of organisms related to human disease. Lectures and laboratory

124 **Immunohematology** (3)
Immunological aspects of transfusion of human blood. Emphasis on preparation and administration of blood components. Lectures and laboratories

125 **Clinical Hematology and Coagulation** (4)
Principles of laboratory detection, clinical correlation, and pathophysiology of human blood cell diseases and disorders of hemostasis. Lectures and laboratory

126 **Clinical Immunology** (1)
Principles of immunologic assays and clinical correlation with human disease. Lectures and laboratory

127 **Clinical Laboratory Management** (1)
Basic concepts of laboratory management, including organizational principles, financial management of resources, decision-making and problem-solving skills, human resource management

130 **Clinical Chemistry Practicum** (4)
Rotation through the University Hospital clinical chemistry laboratory

131 **Clinical Microbiology Practicum** (5)
Rotation through a clinical microbiology laboratory

132 **Hematology, Coagulation, and Urinalysis Practicum** (4)
Rotation through the clinical hematology, hemostasis, and urinalysis laboratories

133 **Blood Bank and Serology Practicum** (4)
Rotation through the blood bank and clinical immunology laboratory

140 **Independent Study in Clinical Laboratory Science** (arr.)
Intensive review of clinical laboratory science, with assigned readings and participation in selected courses in the clinical laboratory science program. Registration by petition

201–2 **Pathology** (arr.)
A year-long course; required for second year medical students. General introduction to concepts of disease. Pathology of organ systems, correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies

229 **Pathology for Health Sciences Students** (4)
Lecture course. Basic concepts and language of pathology, infectious diseases and fundamental disease processes. Emphasis on pathogenesis and dynamics of disease. Causation, evolution, and morphology of pathological changes in the principal diseases of each organ system, presented in coordination with clinical lectures in HCS 225

252 **Introduction to Basic Laboratory Medicine** (2)
Theory, performance, and interpretation of routine clinical laboratory tests done in a physician's office, such as complete blood counts with differentials, urinalysis, and microbiological culture and staining techniques. Lectures, demonstrations and laboratory. Prerequisite: Path 229

284 **Ophthalmic Pathology** (arr.)
Participation in an active service limited to pathology of the eye and its adnexa, particularly inflammatory, degenerative, and neoplastic diseases. Armed Forces Institute of Pathology

289 **Clinical and Anatomical Pathology** (arr.)
Designed to familiarize the student with the operation of the pathology department in a community hospital. Student may elect to concentrate in a specialized area or to study only anatomic pathology. A nuclear medicine elective is also available. Fairfax Hospital

290–92 **Extramural Pathology Elective** (arr.)

296 **Surgical Pathology** (arr.)
Evaluation of surgical specimens and correlation with clinical status of patient. Description of gross and microscopic findings on assigned cases.

298 **Autopsy Pathology** (arr.)
Organ changes in disease, gross and microscopic correlation, preparation of protocols. Participation in autopsy pathology service. University Hospital.

302 **Forensic Pathology** (arr.)
Experience in the Office of the Chief Medical Examiner of the District of Columbia. Observation of death scene investigation techniques, medical–legal autopsies, and related toxicological laboratory analyses, attendance at court trials, and participation in the various conference activities of the agency.

320 **Transfusion Medicine** (arr.)
Didactic sessions, guided reading assignments, clinical consultations, laboratory bench work, and weekly conferences provide structured introduction to basic principles of transfusion medicine, including clinical and laboratory indications for use of blood components, diagnosis, management, and prevention of adverse transfusion reactions, and basic immunohematology and blood groups.

321 **Clinical Pathology/Laboratory Medicine** (arr.)
Rotations through clinical chemistry, hematology, microbiology, and transfusion medicine (blood bank) laboratories providing guided readings, laboratory experience, didactic presentations, weekly conferences, and opportunities for clinical consultation. Basic principles of laboratory technology applied to the diagnosis and management of clinical disorders, with special focus on the appropriate interpretation of laboratory data.

322 **Blood Bank and Transfusion Medicine** (arr.)
Participation in consultative activities of a transfusion medical service, including therapeutic apheresis, investigation of transfusion reactions, immunohematologic problems, and component therapy. The collection, preparation, processing, and storage of blood and blood components. Fairfax Hospital.

501 **Selected Topics in Pathology** (3)
Guided readings, study, and or laboratory experience in an aspect of pathology of particular interest to students. Students present a report on the specific topic.

800 **Summer Remedial: Pathology** (8)

Pediatrics

[illegible] B. Avery *(Chair)*

[illegible]ess otherwise indicated, all courses are held at Children's National Medical Center.

303 **Pediatric Clerkship** (10)
Required for medical students. Full-time experience as part of resident team. Ward rounds, work in outpatient department and specialty clinics under staff supervision, lectures, clinical conferences, grand rounds. Includes child psychiatry and child guidance. Eight-week periods throughout the academic year.

361 **Clinical Pediatrics Acting Internship: Infectious Diseases** (5)

362 **Clinical Pediatrics Acting Internship: General Medicine** (5)

363 **Clinical Pediatrics Acting Internship: Hematology/Oncology** (5)

365 **Clinical Pediatrics Acting Internship: General Pediatrics** (5)
Holy Cross Hospital.

368 **Pediatric HIV Infection** (arr.)

369 **Pediatric Infectious Disease Consultation Service** (arr.)

373 **Pediatric Urology** (arr.)

375 **Pediatric Surgery** (arr.)

376 **Pediatric Neurology** (5)

378 **Genetics** (5)

[illegible] **Pediatric Critical Care** (arr.)

381 **Pediatric Allergy and Immunology** (5)

382 **Pediatric Radiology** (arr.)

383 **Pediatric Pulmonary Medicine** (arr.)

386 **Pediatric Hematology/Oncology** (5)

388 **Neonatal Medicine** (arr.)

389 **Pediatric Cardiology** (5)

390–95 **Extramural Pediatric Elective** (arr.)
397 **Pediatric Nephrology** (arr.)
399 **Ambulatory Adolescent Medicine** (5)
400 **Pediatric Laboratory Medicine** (arr.)
401 **Pediatric Otolaryngology** (5)
403 **Pediatric Rehabilitation** (arr.)
405 **Pediatric Emergency Room** (arr.)
501 **Embryologic Basis of Pediatric Surgery** (3)
502 **Being an Effective Teacher** (2)

Pharmacology

V.A. Chiappinelli *(Chair)*

170 **Introduction to Pharmacology and Toxicology** (3)
The absorption, distribution, metabolism, and excretion of drugs and toxic substances. Mechanisms of toxicity. Same as PubH 170.
201–2 **Pharmacology** (5–3)
Required for second-year medical students. Lectures, laboratory, and conferences on interaction of drugs and biological systems as a basis for rational disease therapy. Prerequisite: Bioc 201; Phyl 201, 212.
207 **Pharmacology for Health Sciences Students** (4)
Drug disposition. Autonomic nervous system, cardiovascular and gastrointestinal drugs. Psychopharmacology. Analgesics, sedatives, anticonvulsants. Chemotherapy, toxicology, endocrinology. Prerequisite: Anat 215, Phyl 211, or equivalent.
290–91 **Extramural Pharmacology Elective** (arr.)
501 **Readings in Pharmacology** (arr.)
Readings, discussions, and/or preparation of report. Student can choose to work with one or more faculty members in the department on a topic of mutual interest.
502 **Clinical Use of Drugs** (3)
Discussion of the rational use of drugs in the treatment of disease. Independent reading and study.
800 **Summer Remedial: Pharmacology I** (6)
801 **Summer Remedial: Pharmacology II** (2)

Physiology and Experimental Medicine

W.B. Weglicki *(Chair)*

Departmental prerequisite: Phyl 201 or equivalent is prerequisite to all courses numbered above 201.

191 **Selected Topics in Human Structure and Function** (3)
Structural and functional basis of physiology. Required for graduate students who have not had Anat 201 or equivalent; students may receive graduate credit on completion of additional work as prescribed by the instructor. Prerequisite: BiSc 11–12 or equivalent and consent of instructor. Open to Columbian School students with approval of advisor.
201 **Physiology** (7)
Required for medical students, open to graduate students. Cellular, organ system, and applied human physiology. Prerequisite for graduate students: Anat 201 or Phyl 191, or equivalent; Bioc 221 or Phyl 205, or consent of department chair. Concurrent registration: Phyl 212. Open to consortium students only with permission of department chair.
211 **Physiology for Health Sciences Students** (3)
Function and process of the human body, covering the major organ systems.
290–91 **Extramural Physiology Elective** (arr.)
295 **Research** (arr.)
By special arrangement with individual staff members. Approximately four hours per week in the laboratory for each credit hour of credit. May be repeated for credit.

502 **Structural–Functional Correlations in GI Disease** (arr.)
Morphological methodology, technique in the diagnosis and prognostic evaluation of gastrointestinal disease states such as ulceration, colitis, Hirschprungs disease, colorectal carcinoma, and pancreatic malfunction. Techniques considered include traditional light microscopy, scanning and transmission electron microscopy, and immunocytochemistry. Selected readings and discussion.
800 **Summer Remedial: Physiology** (8)

Psychiatry and Behavioral Sciences

D.A. Mrazek *(Chair)*

301 **Psychopathology and Conceptual Models** (2)
Required for second-year medical students. Mental mechanisms, psychopathology, introduction to psychiatric syndromes, clinical interviewing, and behavioral sciences in clinical medicine.
302 **Clinical Clerkship** (10)
Required for medical students. Supervised examination, diagnosis, and outpatient and inpatient treatment at University, St. Elizabeths, Children's, and V.A. Hospitals and Northern Virginia Mental Health Institute. Case conferences, seminars on psychiatric referral, "psychiatric" drugs, and community resources, with emphasis on psychiatry in general practice.
379 **Inpatient Psychiatry Acting Internship** (5)
Northern Virginia Mental Health Institute
380 **Outpatient Psychiatry and Crisis Intervention** (arr.)
381 **Clinical Psychiatry** (arr.)
382 **Psychiatric Consultation-Liaison Service** (5)
384 **Psychiatric Research Elective** (arr.)
385 **Psychiatric Research Elective** (arr.)
National Institute of Mental Health
387 **Psychiatric Research Elective** (arr.)
Children's National Medical Center.
388 **Child and Adolescent Psychiatry** (arr.)
Children's National Medical Center
389 **Clinical Geriatric Psychiatry** (arr.)
390–93 **Extramural Psychiatry Elective** (arr.)
397 **Schizophrenic and Borderline Conditions** (5)
Chestnut Lodge.
404 **Eating Disorders** (arr.)
409 **Independent Study** (arr.)
800 **Summer Remedial: Medical Practice** (3)
801 **Summer Remedial: Conceptual Models** (2)

Radiology

B.M. Potter *(Interim Chair)*

100 **Introduction to Clinical Procedures** (3)
An introduction to clinical work in the radiologic sciences. Lectures cover the organization of hospitals and departments, roles and functions of radiologic science professionals, and principles of patient care and radiation safety. Students participate in clinical observations in all radiologic science disciplines. Course includes a review of medical terminology.
101–2 **Nuclear Medicine Clinical Practicum I–II** (3–3)
Supervised experience in procedures and methods of nuclear medicine technology with emphasis on indications and contraindications, safety techniques, preparation and development of radiopharmaceuticals, research methods, and administrative procedures.
103–4 **Clinical Nuclear Medicine I–II** (3–3)
Study of routine procedures done in a nuclear medicine department. Aspects of anatomy, physiology, and pathology that relate to organ imaging, organ concentration–excretion measurements, and hematologic and dilution procedures.

105–6 **Clinical Echocardiography I–II** (1–1)
Supervised fieldwork in observing, assisting, and performing echocardiography examinations at imaging sites. Provides practical experience in routine procedures. Prerequisite: Rad 100

107–10 **Radiation Therapy Clinical Practicum** (2–3–3–3)
Supervised fieldwork in treatment planning and therapeutic applications. Students gain experience in a variety of technical methods and procedures in the management of patients undergoing radiation therapy at a local radiation oncology facility. Prerequisite: Rad 100

111 **Special Projects Elective for Radiation Therapy Students** (1 to 3)
Supervised fieldwork in a selected area of radiation therapy planning and delivery. Students develop learning objectives in conjunction with faculty advisor. Prerequisite: Rad 100

112–15 **Sonography Clinical Practicum I–II–III–IV** (2–3–2–2)
Clinical rotations in diagnostic medical sonography. Students perform supervised sonographic examinations in vascular, ob/gyn, general ultrasound, and/or echocardiography departments. Prerequisite: Rad 100

120 **Physics of Nuclear Medicine** (3)
Introduction to properties of nuclei and nuclear models, forces, and reactions. Study of radioactive decay, ionization processes in matter, radiation dosage, and radionuclides in biology and medicine.

121 **Nuclear Instrumentation** (3)
Introduction to radiation detectors used in a nuclear medicine department, including dose calibrators, survey instruments, spectrometers, stationary cameras, and SPECT and PET instruments.

122 **Radiopharmaceuticals** (3)
Uses of radionuclides in medicine, basic principles of a Mo–99/Tc–99m generator, radiopharmaceuticals and their action within the body, preparation of radiopharmaceuticals using generator-produced nuclides, quality control, accountability, procurement, clinical orientation.

123 **Computer Applications in Nuclear Medicine Technology** (3)
Use of computers in *in vivo* and *in vitro* procedures; analysis of other clinical data in nuclear medicine. Lecture and laboratory.

130–31 **Radiation Therapy Techniques I–II** (3–3)
An overview of the principles and methods used in radiation oncology simulation and treatment, including patient positioning and immobilization, topographic and radiographic anatomy, and the fundamentals of radiographic exposure. Principles of radiation therapy applied to specific oncologic sites are covered, as well as methods of limiting doses to critical organs and the side effects of treatment.

132–34 **Radiation Therapy Physics, Dosimetry, and Safety I–II–III** (3–3–3)
Concepts of interaction of radiation with matter. Techniques of treatment planning, including concepts of linear source, dosimetry, and computer treatment planning. Introduction to the dosimetry of electrons and neutrons. Concepts of radiation detection and safety as applied to radiation therapy, including effects of time, distance, and shielding.

135 **Quality Assurance in Radiation Therapy Technology** (1)
Quality assurance procedures, including review of patient charts, monitoring of equipment, and evaluation of treatment facilities.

136 **Radiation Oncology** (3)
Study of the etiology, epidemiology, and staging of cancer. Emphasis on pathology, work-up, clinical features, and multimodality treatment results for each of the major oncologic sites.

137 **Patient Care and Management** (2)
Emphasis on patient care and aseptic techniques as they relate to the radiology service. Fundamental concepts of the dying process, including attitudes and experiences.

140 **Practical Approach to Diagnostic Ultrasound** (3)
Introductory course open to non-majors. Basics of diagnostic ultrasound with an emphasis on applications, ultrasound physics, scanning fundamentals, and cross-sectional anatomy for general ultrasound. Prior knowledge of human anatomy is preferred but not required.

141 **Physics of Sonography** (3)
Fundamental principles of the physics of two-dimensional and Doppler sonography, generation of ultrasound images, artifacts, bioeffects, and instrumentation.

142 **Vascular Sonography** (3)
Fundamentals of duplex ultrasound, with emphasis on the detection of vascular disease affecting the carotids and upper and lower extremities. Basic scanning techniques and protocols relative to vascular ultrasound.

143 **Abdominal Sonography** (3)
Abdominal sonography, including anatomy, pathology, scan techniques, clinical signs and symptoms of disease, and interpretation of normal and abnormal sonograms.

144 **Obstetric Sonography** (3)
Obstetric sonography, including biometry and ultrasound evaluations of fetal pathology.

145 **Pelvic Sonography** (2)
Gynecological ultrasound; anatomy and pathology of the female pelvis, analysis of transabdominal and endovaginal sonograms.

146 **High-Resolution Ultrasound** (3)
High-resolution ultrasound, including sonography of the breast, neonatal head, thyroid, testes, and prostate. Innovations in sonography.

147–48 **Echocardiography** (2–3)
Cardiac anatomy and pathology; protocols and techniques for the routine echocardiographic examination. Valvular disease, hypertensive heart disease, cardiomyopathy, pericardial disease, neoplasms, ischemia, aortic disease, prosthetic devices, transplants, and adult congenital heart disease.

160 **Radiation Biology** (3)
Chronic and acute effects of ionizing radiation on cells, tissues, organs, and the body as a whole. Organic and inorganic molecules, the human immune system, effects of radiation on pregnancy and the relative radiosensitivity of the developing embryo; possible genetic effects of radiation.

161 **Comparative Imaging** (2)
Senior seminar in which students participate in comparative analysis of images obtained in various diagnostic modalities, e.g., planar radiography, nuclear medicine, MRI, CT, and sonography.

162 **Multiplanar Sectional Anatomy** (3)
The three-dimensional relationship of anatomical structures as seen in magnetic resonance images. The anatomy of all major systems are studied in the sagittal, coronal, and axial imaging planes.

163 **Computer Applications in Radiology** (3)
Administrative and clinical applications of the digital computer in radiology, with emphasis on the design, procurement, and implementation of computer systems. Students participate in team projects involving operational management or clinical systems, write a paper, and prepare a class presentation based on project results.

180 **Mammography for Radiologic Technologists** (3)
Basic physics, anatomy, positioning, and quality assurance topics for the experienced radiologic technologist or the novice mammography technologist for in-depth mammography concepts.

181–82 **Physics of Diagnostic Radiology** (3–3)
Mechanisms in the production of X-rays and X-ray circuits. Interaction of radiation with matter. Beam restrictors, grids, film, screens, fluoroscopic systems, computerized tomography, mammography, ultrasound, and magnetic resonance imaging. Prerequisite: Rad 130.

183 **Quality Control in X-Ray Imaging** (3)
Laboratory course. Experience in quality assurance testing of processor, film, darkroom systems, X-ray generators and tubes, phototimers, fluoroscopic systems, and conventional and computerized tomography systems. Establishing, maintaining, and evaluating equipment-testing programs. Prerequisite: Rad 167 or permission of instructor.

184 **Fundamentals of Magnetic Resonance Imaging** (3)
Introduction to magnetic resonance imaging, including physical principles, imaging principles, equipment design, siting requirements, clinical safety, quality assurance, image interpretation, special techniques, financial considerations, and future technical developments. Prerequisite: one year of college-level physics.

190 **Sonography Registry Review** (0)
Registry review workshops, including guest lectures and conferences.

191 **Special Projects in Radiology** (arr.)
For radiology students who wish to pursue independent research on a current topic in radiology, physics, or administration. A written report is required. May be taken for graduate credit.

192 **Senior Project** (1 to 3)
A senior seminar in which students identify, develop, and complete a paper of publishable quality on a research or administrative topic related to radiologic sciences or health care.

193 **Radiologic Resource Management Project** (4)
Individualized project in radiologic administration, personnel, education, or related field, designed by the student and approved by the program director. A written report and oral presentation at a student seminar are required.

201 **Advanced Topics in Nuclear Magnetic Resonance** (3)
Topics include generation of nuclear magnetic resonance signals, Bloch equations, rotating frame analysis, relaxation mechanisms, quadrature phase detection, chemical shift, receiver coil design, image encoding, slide selection shim coils, magnet design, data processing, quality assurance, and zonal and tesseral harmonics mapping. Prerequisite: permission of instructor.

383 **Clinical Radiology** (5)

385 **Nuclear Medicine** (arr.)

386 **Radiation Oncology** (arr.)

387 **Subspecialty Diagnostic Radiology** (arr.)

390–92 **Extramural Radiology Elective** (arr.)

400 **Diagnostic Radiology** (arr.)
Washington Hospital Center.

402 **Introduction to Chest Radiology** (3)

403 **Introduction to Bone Radiology** (3)

404 **Special Procedures in Radiology** (3 to 5)

Surgery

J.M. Giordano *(Chair)*

303 **Clinical Clerkship** (10)
Required for medical students. Eight weeks at University Hospital and Walter Reed Army Medical Center.

351 **Otolaryngology, Head and Neck Surgery** (arr.)
Walter Reed Army Medical Center.

352 **Otolaryngology** (arr.)
National Naval Medical Center.

353 **Otolaryngology, Head and Neck Surgery** (arr.)

376 **Advanced Surgery** (5)

378 **Intensive Care Unit** (5)
Washington Hospital Center.

380 **General Surgery and Surgical Oncology** (5)

384 **Thoracic/Cardiovascular Surgery** (5)

385 **Plastic and Reconstructive Surgery** (arr.)
University Hospital and Children's National Medical Center.

390–95 **Extramural Surgery Elective** (arr.)

400 **Special Programs** (arr.)
Special elective developed in consultation with department faculty.

401 **Peripheral Vascular Surgery** (arr.)
V.A. Medical Center.

402 **Burns** (arr.)
Washington Hospital Center.

403 **Peripheral Vascular Surgery** (5)

405 **Hand Surgery Clinic/Research** (arr.)
Walter Reed Army Medical Center.

406 **Plastic Surgery Clinic/Research** (arr.)
Walter Reed Army Medical Center.

Urology

M.J. Manyak *(Acting Chair)*

302 **Clinical Clerkship** (3)
The clerkship will partially fulfill the surgical subspecialty requirement. Observation of urologic conditions and procedures for diagnosis and treatment. Radiologic and pathologic studies, endoscopy and surgery, collateral reading, weekly staff conference.

390–92 **Extramural Urology Elective** (arr.)

Faculty and Staff of Instruction

The following list represents the full-time faculty of the School of Medicine and Health Sciences as of January 1998. Only primary appointments are shown.

Fred Paul Abramson, *Professor of Pharmacology*
B.A. 1962, Case Western Reserve University; Ph.D. 1965, Ohio State University

George Acs, *Associate Professor of Pediatrics*
B.S. 1976, Fordham College; D.M.D. 1980, M.P.H. 1983, Harvard University

Terry Alayne Adirim, *Assistant Professor of Pediatrics*
B.A. 1985, Brandeis University; M.P.H. 1990, Harvard University; M.D. 1991, University of Miami

James David Ahlgren, *Professor of Medicine*
B.S. 1955, Massachusetts Institute of Technology; M.D. 1977, Georgetown University

Jeffrey Scott Akman, *Associate Professor of Psychiatry and Behavioral Sciences*
B.S. 1977, Duke University; M.D. 1981, George Washington University

Julia W. Albright, *Professor of Microbiology and Immunology*
B.S. 1962, East Tennessee State University; M.S. 1972, University of Akron; Ph.D. 1978, Indiana State University

Lisa Mustone Alexander, *Assistant Professor of Health Care Sciences*
B.A. 1976, Providence College; B.S. 1979, M.P.H. 1989, George Washington University

E. Pendleton Alexander, *Assistant Professor of Surgery*
B.A. 1975, University of Southern California; M.D. 1982, University of Nevada

Hany Z. Aly, *Assistant Professor of Pediatrics*
M.B., B.Ch. 1986, Ain Shams University

David Alyono, *Associate Professor of Surgery*
B.S. 1974, M.S. 1974, Emory University; M.D. 1978, Duke University; Ph.D. 1987, University of Minnesota

Antonina Neri Amigable, *Assistant Professor of Medicine*
M.D. 1966, Cebu Institute of Medicine

Anne Lisette Angiolillo, *Assistant Professor of Pediatrics*
B.S. 1982, Muhlenberg College; M.S. 1985, George Washington University; M.D. 1989, New York Medical College

Aram Albert Arabian, *Assistant Professor of Medicine*
B.A. 1965, Boston University; M.D. 1975, Brown University

Elda Yleana Arce, *Assistant Professor of Pediatrics*
M.D. 1974, Cayetano Heredia University, Peru

Anthony Gerald Arcenas, *Assistant Professor of Medicine*
B.S. 1981, M.D. 1985, University of the Philippines

Gilbert Paul August, *Professor of Pediatrics*
B.S. 1958, City University of New York, City College; M.D. 1962, New York University

Audrey Austin, *Assistant Professor of Pediatrics*
B.S.N. 1977, Wagner College; M.Ed. 1979, Columbia University; M.D. 1985, Universidad del Noreste

Gordon B. Avery, *Professor of Pediatrics*
B.A. 1953, Harvard University; M.D. 1958, Ph.D. 1959, University of Pennsylvania

Eugenia Mason Ayers, *Assistant Professor of Health Care Sciences*
B.A. 1967, University of Pennsylvania; M.Ed. 1973, Towson State University; M.S. 1988, University of Maryland; M.D. 1991, George Washington University

Mahnaz Badamchian, *Associate Research Professor of Biochemistry and Molecular Biology*
B.S. 1971, M.Sc. 1974, University of Tabriz, Iran; Ph.D. 1983, Utah State University

Ali Amjed Bader, *Assistant Professor of Pediatrics*
M.D. 1980, Osmania University, India

J. Martyn Bailey, *Professor of Biochemistry and Molecular Biology*
B.S. 1949, Ph.D. 1952, D.Sc. 1971, University of Wales

Susan Deanne Baker, *Assistant Professor of Anesthesiology*
B.S. 1978, Harding University; M.D. 1982, University of Arkansas

William Otto Bank, *Professor of Radiology*
B.A. 1963, Baldwin Wallace College; M.D. 1967, University of Michigan

Joan K. Barber, *Associate Professor of Psychiatry and Behavioral Sciences*
B.A. 1946, Wellesley College; M.D. 1949, Cornell University

Joseph A. Barbera, *Assistant Professor of Emergency Medicine*
B.S. 1976, University of Notre Dame; M.D. 1980, University of Pittsburgh

Vanessa Marie Barnabei, *Associate Professor of Obstetrics and Gynecology*
B.S. 1976, Rutgers University; Ph.D. 1981, M.D. 1985, University of Virginia
Werner Franklin Barth, *Professor of Medicine*
B.A. 1956, Columbia University; M.D. 1960, Yeshiva University
Susanne L. Bathgate, *Assistant Professor of Obstetrics and Gynecology*
B.S. 1981, University of California, Irvine; M.D. 1986, George Washington University
Eliel Bayever, *Associate Professor of Pediatrics*
M.B. B.Ch. 1973, University of Witwatersrand, South Africa; M.D. 1979, Royal College of Physicians, United Kingdom
Matthew Joseph Becker, *Assistant Professor of Anesthesiology*
B.S. 1971, Massachusetts Institute of Technology; M.D. 1974, Duke University
Richard Bruce Becker, *Associate Professor of Anesthesiology*
B.A. 1981, M.D. 1985, University of Virginia
Kenneth Louis Becker, *Professor of Medicine*
B.A. 1952, University of Michigan; M.D. 1956, New York Medical College; Ph.D. 1963, University of Minnesota
Michael J. Bell, *Assistant Professor of Anesthesiology*
B.S. 1987, Cornell University; M.D. 1991, State University of New York at Stony Brook
A. Barry Belman, *Professor of Urology*
B.A. 1960, University of Arizona; M.D. 1964, M.S. 1969, Northwestern University
Brenda Jean Berberian, *Professor of Dermatology*
B.S. 1978, Tufts University; M.D. 1982, Georgetown University
John Torrey Berger III, *Assistant Professor of Pediatrics*
B.A. 1985, University of Virginia; M.D. 1989, Washington University
Kaaren Marie Nyhus Bergquist, *Assistant Professor of Radiology*
B.S. 1962, University of Wisconsin-Eau Claire; M.D. 1968, Case Western Reserve University
Jerald Jack Bernstein, *Research Professor of Physiology and Experimental Medicine*
B.A. 1955, City University of New York, Hunter College; M.S. 1957, Ph.D. 1959, University of Michigan
Michael Joseph Berrigan, *Seymour Alpert Professor and Associate Professor of Anesthesiology*
B.S. 1974, Niagara University; Ph.D. 1982, State University of New York at Buffalo; M.D. 1986, George Washington University
Steven A. Bielamowicz, *Assistant Professor of Surgery*
B.S. 1984, M.D. 1988 Baylor University
Mary Beth Bigley, *Assistant Professor of Health Care Sciences*
B.S.N. 1980, Salve Regina University; M.S.N. 1990, George Mason University
Helga Wagner Binder, *Professor of Pediatrics*
M.D. 1957, Humboldt University, Germany
Benjamin Carl Blatt, *Associate Professor of Health Care Sciences*
B.A. 1966, Tufts University; M.A. 1968, Brandeis University; M.D. 1972, Medical College of Virginia of Virginia Commonwealth University
Douglas Alan Boenning, *Associate Professor of Pediatrics*
B.A. 1973, Johns Hopkins University; M.D. 1977, University of Maryland
Ronald Carl Bohn, *Associate Professor of Anatomy and Cell Biology*
B.S. 1974, M.S. 1976, Pennsylvania State University; Ph.D. 1979, State University of New York Upstate Medical Center
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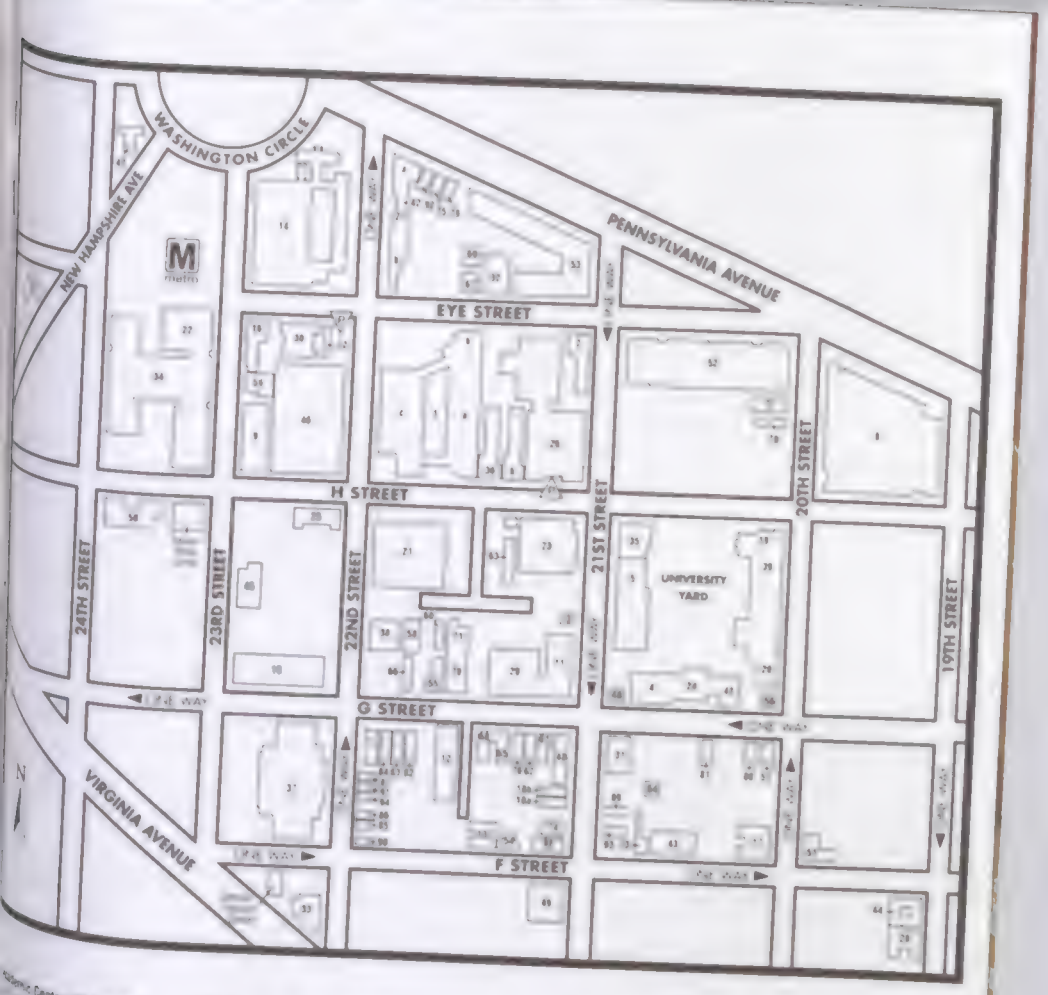
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Index

Abbreviations, key to, 62
Academic performance, evaluation of, M.D students, 28
Academic progress, satisfactory, M.D. students, 41
Academic status (accreditation) of the University, 5
Administration, officers of
  Of the University, 7
  Of the Medical Center, 8
Admission
  To M.D. program, 23
  To health sciences programs, 46
Advanced standing, *see* program concerned
Alumni associations, 21
Anatomy and cell biology, 63
Anesthesiology, 64
Auditing, 53
Awards, for M.D. students, 43
Biochemistry and molecular biology, 64
Certificate programs, 61
Changes in program of study, 53
Clinical laboratory science, 58
Committees, 21
Computer medicine, 64
Continuous enrollment, 53
Course numbers, explanation of, 62
Dean's list, 52
Dermatology, 64
Dishonesty, academic, 35
Dismissal from the University, 10
  See also program concerned
Doctor of Medicine degree program, 23
Emergency medical services, 59
Emergency medicine, 65
Equal opportunity, University policy on, 5
Facilities, 19
Faculty and staff of instruction, 88
Fees and financial regulations, 11
Financial aid
  For M.D. students, 40
  For health sciences students, 55
Graduation requirements, *see* regulations for program concerned
Health care sciences, 68
Health sciences programs, 46
Health service, student, 14
Honor societies, 45, 55
Honors, 25
Housing and food service, 15
Insurance, health and accident, 14
Interdisciplinary courses, 75
Irregular progress, M.D. students, 31
Leave of absence, 31, 53
Libraries, 10, 19
Master of Science in Health Sciences degree program, 60
Medicine, 76
Microbiology and immunology, 78
Neurological surgery, 78
Neurology, 78
Nurse practitioner, post-master's certificate program, 61
Obstetrics and gynecology, 79
Ophthalmology, 79
Orthopaedic surgery, 79
Pathology, 79
Pediatrics, 81
Pharmacology, 82
Physician assistant program, 60
Physiology and experimental medicine, 82
Probation, 52
Professional comportment, evaluation of, 31, 55
Property responsibility, 11
Psychiatry and behavioral sciences, 83
Radiologic sciences, 59
Radiology, 83
Readmission, 48
Refunds, 13
Regulations
  University, 9
  Financial, 11
  For M.D. students, 27
  For health sciences students, 49, 55
Residence requirements, *see* program concerned
Scholarship requirements for health sciences students, 50
Student life, 14
Student information, release of, 9
Surgery, 86
Transcripts, 53
Transfer credit (advanced standing), 48, 60
Trustees, board of, 5
Tuition and other fees, 11
Unclassified students, 48
Urology, 87
Withdrawal, 13
  See also regulations for program concerned



- Lisner Auditorium
- Lisner Hall
- Madison Hall
- Marvin Center
- Medical Faculty Associates
  - a
  - b
- Mitchell Hall
- Monroe Hall
- Monson Hall
- Quigley's
- Rice Hall
- Riverside Towers Hall
- Rossi Hall
- Samson Hall
- Schlesinger Hall
- Smith Center
- Stanghton Hall
- Stockton Hall
- Strong Hall
- Stuart Hall
- Student Health Service
- Support Building
- Thurston Hall
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- Woodhull House
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- 2100 Pennsylvania Ave.
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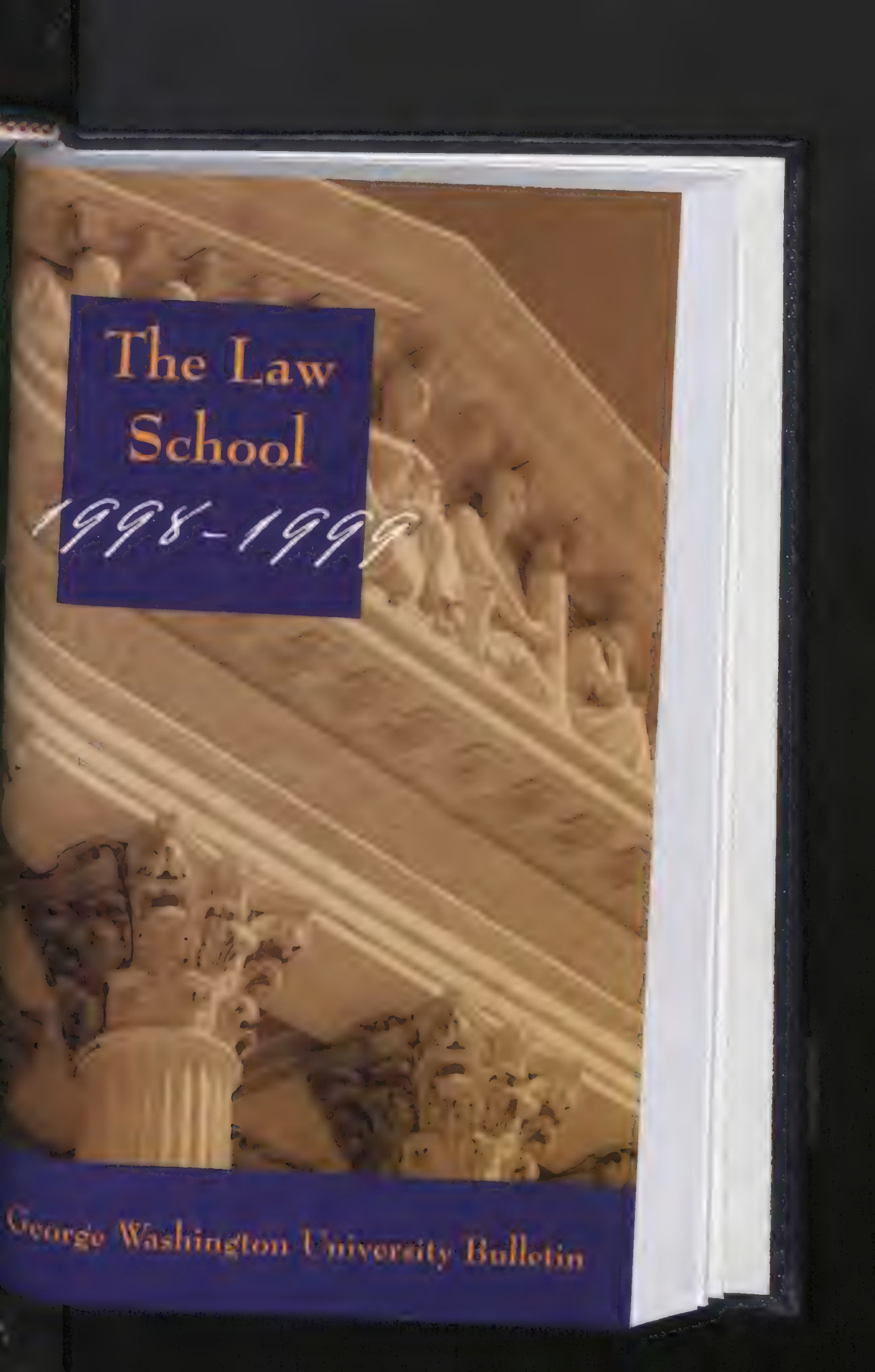
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The George Washington University


The Law School
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As a founding member of the Association of American Law Schools, The George Washington University Law School subscribes to that Association's bylaws, including the following statements: "A member school shall provide equality of opportunity in legal education for all persons, including faculty and employees with respect to hiring, continuation, promotion and tenure, applicants for admission, enrolled students, and graduates, without discrimination or segregation on the ground of race, color, religion, national origin, sex, age, handicap or disability, or sexual orientation. A member school shall seek to have a faculty, staff, and student body which are diverse with respect to race, color, and sex."

The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible

Contents

Page

4 Academic Calendar
5 The George Washington University Law School
7 The Juris Doctor Degree
7 Entrance Requirements
7 Admission
8 Degree Requirements
9 Academic Regulations
15 Joint Juris Doctor–Master's Degree Programs
16 Graduate Programs
16 The Master of Laws Degree
24 The Doctor of Juridical Science Degree
26 Fees and Financial Regulations
29 Financial Aid
32 Prizes and Awards
33 General Information
33 Day and Evening Classes
33 Summer Session
33 Registration
34 Graduation Requirements
34 Transcripts of Record
34 Policy on Academic Integrity
35 Student Activities and Student Life
35 Enrichment Program
35 Publications
36 Skills Boards
36 Law Student Organizations
37 Facilities and Services
37 The Law School
37 The Jacob Burns Law Library
38 Career Development and Placement Services
38 Continuing Legal Education
38 Housing
38 Food Service
38 The Cloyd Heck Marvin Center
38 The Charles E. Smith Center
39 Student Health Service
39 Disability Support Services
40 University Regulations
42 Courses of Instruction
42 Planning a Balanced Program
43 Career Planning and Course Selection
49 Practice Areas
85 Course Descriptions
88 Alphabetical List of Courses
89 The University
91 The Board of Trustees of the University
91 Officers of Administration
94 Alumni Associations
97 Faculty and Staff of Instruction
117 Index

The Academic Calendar 1998–1999

1998 Fall Semester

August 19–21	Fall orientation and registration for new students
August 24	Classes begin
	Application for January 30 graduation due in Records Office
August 31	Last day of Drop/Add
September 7	Labor Day (holiday)
September 11	Deadline for Credit/No Credit option
October 8	S.J.D. dissertations of candidates for January 30 graduation due
November 24	Constructive Friday (all Friday classes meet)
November 25–27	Thanksgiving recess
December 3	Last day of fall semester classes
December 4	Reading day or snow day
December 7–18	Examination period

1999 Spring Semester

January 11	Classes begin
	Application for May graduation due in Records Office
January 18	Martin Luther King, Jr., Day (holiday)
January 19	Last day of Drop/Add
January 29	Deadline for Credit/No Credit option
	S.J.D. dissertations of candidates for May graduation due
February 15	President's Day (holiday)
March 29–April 2	Spring recess
April 27	Constructive Monday (all Monday classes meet)
	Last day of spring semester classes
April 28–30	Reading period or snow days
May 3–14	Examination period
May 30	Commencement

The George Washington University Law School

History

The George Washington University Law School, the oldest law school in the District of Columbia, was established in 1865 with a formal program of two years of study. This was largely through the efforts of the Reverend Whitefield Samson, President of Columbian College, whose action resulted in the purchase of a separate building for holding law classes. The building had belonged to Trinity Church, of which Francis Scott Key had been Senior Warden. It was occupied by the Law School until 1884.

Sixty graduates, from 22 of the then 37 states, received degrees in 1867. The school continued to have a student body and a faculty that reflected the fact that it was at the seat of our nation's government. Supreme Court Justices David J. Brewer and John Marshall Harlan were among the prominent members of the bench and bar who were on the faculty.

In 1877, one year after the first such program was adopted in the United States, the Law School instituted a course leading to the degree of Master of Laws. In 1898, the course of instruction for the degree of Bachelor of Laws was extended to three years. The Law School took part in 1900 in the organization of the Association of American Law Schools.

In the past quarter-century the Law School expanded its course and seminar offerings with consideration of the needs of first-degree and graduate students. The degree of Doctor of Juridical Science was instituted in 1940. In 1946, the Law School began accepting foreign attorneys into specially designated programs. Today, lawyers from other countries are accepted into the Master of Laws program.

In 1954, the National University School of Law, which had held an important place in legal education in the District of Columbia since 1869, was absorbed by The George Washington University Law School.

Since 1954, special programs of advanced study have enriched the basic curriculum. At present these include Environmental Law; Intellectual Property Law; International and Comparative Law; Government Procurement Law; and Litigation and Dispute Resolution. These special programs reflect the breadth in public law for which the Law School is well known. Additionally, a clinical law program has been developed that is the equal of that at any law school in the nation.

Two research centers were established at the Law School in 1992. The International Rule of Law Center sponsors conferences and engages in studies and research relating to international norms and institutions that advance human rights, the rule of law, democratic pluralism, and conflict resolution. The Dean Dinwoodey Center for Intellectual Property Studies and Freedom of Expression provides a forum for policy debates over patent law reform, international treaties, and case law; a home for visiting scholars from Asia and Europe; and seminars for advanced study of intellectual property issues.

Location in the Nation's Capital

Of special significance is the location of the Law School in a central area of the nation's capital, the focal point of the law in action, both American and international. The work of the school goes on in this environment, presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. Readily accessible are the Supreme Court of the United States, the federal trial and appellate courts of the District of Columbia, and federal courts of special jurisdiction, such as the United States Court of Appeals for the Federal Circuit, the United States Tax Court, and the Court of Military Appeals. Current federal legislation can be studied as it is considered by Congressional committees and as it comes up for debate on the floors of the House of Representatives and

the Senate. With respect to the federal administrative agencies, students here in Washington have matchless opportunities for study and observation. They can attend informal and formal hearings of these agencies and can obtain from the docket sections complete records of administrative adjudication in specific cases. Illustrative of such federal agencies are the Interstate Commerce Commission in the field of transportation; the Federal Trade Commission in the field of trade regulation, the Securities and Exchange Commission in the field of security issues and corporate finance; the National Labor Relations Board in the field of labor–management relations; the United States Patent Office in the field of patent law; the Federal Energy Regulatory Commission in the field of water, natural gas, and electric power; and the Federal Communications Commission in the field of radio and television.

Supplementing these environmental advantages of law in action are the exceptional research library collections in the Library of Congress, in the various departments of the federal government, and in the libraries of the headquarters of national and international organizations. The notable library of the Carnegie Foundation for International Peace has been acquired by The George Washington University for use by research students in international and comparative law.

The years of residence at law school are years of participation in the life of the community, which in the case of The George Washington University Law School is the government of the United States. As a consequence, the study of law takes on added meaning, whether the goal be government service or practice, general or specialized, and whatever the community in which the student plans to practice.

Objectives

The purpose of the Law School is to prepare men and women to meet the needs of society in many fields of law and to encourage scholarly research and writing in the law. The Law School does not emphasize any particular geographic area in its instruction; therefore, it prepares students to practice law in any part of the country. The Law School seeks to fulfill these objectives through a rich and varied curriculum taught by eminent professors and highly qualified specialized instructors; an extensive clinical law program in which students learn legal skills by actual practice, five law journals that specialize in public law, environmental law, intellectual property law, government contracts law, and international law; trial practice, participation in both intra- and interscholastic trial and appellate level moot court competitions; a series of student professional co-curricular activities; studies on an advanced level for foreign as well as for American students; a continuing legal education program for members of the bar, providing them with opportunities for course work within the curriculum; and scholarly research and writing in the law.

Student Body

The Law School has a total enrollment of about 1,700 students. Approximately 1,220 students are in the full-time day division for the J.D. degree and 220 are enrolled in the part-time evening division. More than 250 students, many from abroad, are enrolled in graduate law degree programs.

The Juris Doctor Degree

Entrance Requirements

Admission to the Juris Doctor degree program requires a bachelor's degree from an accredited college or university and a strong academic record. The Admissions Committee takes into account both the grades and the distribution of courses. The Admissions Committee considers personal and scholastic achievements, recommendations (if submitted), and the results of the Law School Admission Test (LSAT). The Committee also seeks social, ethnic, cultural, and geographical diversity in the student body.

Information concerning the Law School Admission Test may be obtained from the Law School's Admissions Office or from Law Services, Box 2001, Newtown, Pennsylvania 18940. The test is administered at various centers in the United States. Testing dates are usually in September, December, February, and June. Completed application forms must be received by Law Services at least one month before the date of the test. It is not necessary to apply to the law school before taking the test.

Admission

Beginning students are admitted only at the start of the fall semester. Because admission decisions are made on a rolling basis, applicants are urged to submit application forms and complete credentials well in advance of the March 1 deadline. This means that the Law School Admission Test should be taken no later than December. Application forms are available at and should be returned to the Office of Admissions, The George Washington University Law School, Washington, D.C. 20052.

The applicant should register with the Law School Data Assembly Service (LSDAS) by completing and mailing the registration forms supplied by Law Services. A transcript from each college or university attended should then be sent directly to LSDAS, Box 2000-M, Newtown, Pennsylvania 18940. The LSDAS will analyze the transcript(s) and send a copy to this law school and others that ordered a report. However, the applicant will be asked, upon acceptance, to submit directly to the Law School a final transcript showing evidence of the receipt of a bachelor's degree.

Advanced Standing (Transfer Students)

A limited number of places is available for students who wish to transfer to the Law School after completing one year of legal studies at a law school accredited by the American Bar Association. A maximum of 28 credit hours may be applied to the Law School's degree requirements. The primary factor considered in an admission decision is the student's first-year performance. No applicant will be accepted for transfer who is ineligible to return in good standing to a previously attended law school. Transfer students may apply for admission to the Law School for either the fall or spring semester. The deadlines for submission of transfer applications are July 1 for the fall semester, December 1 for the spring semester.

Foreign Law School Graduates

A limited number of graduates of foreign law schools who wish to prepare for law practice in the United States may be admitted to the Juris Doctor program. A student in this program who completes 28 credit hours of course work at this law school with a grade-point average of 2.0 or above may petition the Academic Scholarship Committee to be granted 28 hours of advanced standing for law study outside the U.S. and thereby earn the J.D. degree in two years. A student whose average is below 2.0 after taking 28 hours of course work must complete the full J.D. program, which requires 84 hours of course work.

Students will be admitted to this program only at the start of the fall semester. The deadline for application materials is March 1, but applicants are encouraged to submit applications well in advance of the deadline.

Visiting (Unclassified) Students

A law student who is in good academic standing as a degree candidate at an ABA-approved law school may be admitted to the Law School as an unclassified student and earn credit for transfer to his or her law school. Students may apply for visiting student status during the fall, spring, or summer semester. Admission will be based on the availability of space. The deadlines for application materials are July 1 for the fall semester, December 1 for the spring semester, and one month prior to the beginning of the summer session.

Full- and Part-Time Programs of Study

Once admitted to the Juris Doctor degree program, candidates are given the option, as space permits, of attending the full-time day division or the part-time evening division. After the first year, students may, with the dean's permission, transfer from one division to another but should be advised that there may be residency consequences. See Academic Work Load, Residence, and Required Curriculum, below, for regulations governing the day and evening divisions.

Degree Requirements

In order to earn the Juris Doctor degree, students must satisfactorily meet the following academic requirements: Completion of 84 credit hours; fulfillment of the residence requirement; completion of each course in the required curriculum with a passing grade; and maintenance of the minimum grade-point average of 1.67.

Residence

Candidates for the Juris Doctor degree must complete a residence period of three academic years. At least two academic years of residence are required of students admitted with advanced standing. Attendance as a full-time student (11 or more credit hours) for each of the fall and spring semesters constitutes residence for only one academic year, regardless of how many credits over 11 the student takes in any one semester; attendance as a part-time student (8–10 credits each semester) constitutes residence on a proportional basis. Consequently, a full-time student must attend six semesters to meet residence requirements; a part-time student must attend eight semesters plus at least one summer session. For students who transfer between full- and part-time status, fulfillment of the residency requirement will depend upon the number of semesters spent in attendance in each division; such students should seek the advice of the appropriate dean concerning fulfillment of this requirement. Students who attend the summer session receive fractional residence credit. The residency requirement applies to all J.D. students in the Law School.

Required Curriculum

Full-Time Day Division

Full-time students in the day division must take the following schedule in their first year: fall semester—*Contracts I, Torts, Criminal Law, Civil Procedure I,* and *Legal Research and Writing;* spring semester—*Contracts II, Property, Constitutional Law I, Civil Procedure II,* and *Introduction to Advocacy.*

During the second or third year of study, all full-time day division students must take *Professional Responsibility and Ethics* and fulfill the two-credit legal writing requirement.

Part-Time Evening Division

Part-time evening division students must take the following schedule in their first and second years: first year, fall semester—*Contracts I, Torts,* and *Legal Research and Writing*; first year, spring semester—*Contracts II, Criminal Law, Constitutional Law I,* and *Introduction to Advocacy*; second year, fall semester—*Property, Civil Procedure I,* and 3 hours of electives; second year, spring semester—*Civil Procedure II* and 7 hours of electives.

During their second, third, or fourth year of study, all part-time evening division students are required to take *Professional Responsibility and Ethics* and fulfill the two-credit legal writing requirement.

Legal Writing Requirement

Completion of 2 credit hours that are graded on the basis of written work (not examination) is required for the Juris Doctor degree. This requirement may be satisfied by (1) satisfactory completion of Law 656, *Independent Legal Writing*, or a seminar or other course that requires or permits a research paper, (2) satisfactory service on the *Law Review, Journal of International Law and Economics, Environmental Lawyer, American Intellectual Property Law Association Quarterly Journal,* or *Public Contract Law Journal*; or (3) for students who will graduate by January 1999, satisfactory participation in Law 644, *Moot Court*, or Law 654, *Trial Court Competition*.

In order to satisfy the legal writing requirement, the written work product must receive a grade of *C* or better or, if graded on a Credit/No Credit basis, must be of a quality that would receive a grade of *C* or better were evaluation to be made using the letter grade scale. In addition, the instructor or faculty adviser to a journal for which the work is done must certify in writing that the work product meets the legal writing requirement.

The following guidelines have been approved by the faculty for written work designed to satisfy the legal writing requirement. The student should submit the following for approval by the faculty member or appropriate journal editors by specified dates: (1) the topic and length of the work product; (2) an outline of the work product; and (3) one or more drafts of the work product. The draft of a research paper provides the student the opportunity to improve the work product. The faculty member may require a revised draft or may permit one if so requested by the student. All work should follow the Blue Book style.

Academic Regulations

Academic Work Load

Juris Doctor candidates without substantial outside employment (no more than 20 hours a week) may take a program of studies of 15 credit hours per semester. After the first year of study, full-time students may take courses in the evening only if they take a majority of their hours in day courses. The dean is authorized to approve programs of study of more than 15 credit hours in exceptional cases; however, no program will be approved that would permit the student to complete requirements for the degree in less than 28 months after beginning the first year of law study. Students with more than 20 hours of outside employment, whether in the day or evening division, must take a limited program of studies not exceeding 10 credit hours; the minimum load is 8 credit hours, except in special cases when fewer hours may be approved by the dean for a limited time. A minimum schedule of 11 credit hours is required for students to be considered full-time.

Full-time Juris Doctor students may take a maximum of 7 credit hours and part-time students may take a maximum of 5 credit hours in any summer session. This includes hours taken at other law schools' summer programs (see Summer School Credit from Other Law Schools).

Student Employment

A student taking more than 10 hours of course work must limit outside employment to not more than 20 hours. It is urged that all full-time students refrain from engaging in outside employment during their first year. Although work in some special areas may contribute to the learning and experience of the student, as a general rule it will compete with the time needed for adequate study and preparation, which are at the heart of a good legal education.

Academic Evaluation

Grades

Letter grades are given with numerical equivalents as follows.

A+ = 4.33	B+ = 3.33	C+ = 2.33	D = 1.0
A = 4.0	B = 3.0	C = 2.0	F = 0
A− = 3.66	B− = 2.66	C− = 1.66	

Credit toward the J.D. degree is given for all grades between *D* and *A+* (inclusive). A J.D. candidate who receives a grade of *F* or No Credit in a required course must retake that course from the same or a different instructor. Any student who retakes a required course and receives a grade of *F* or No Credit will be excluded from further study and may not graduate unless the student petitions for and receives the permission of the Academic Scholarship Committee. A J.D. candidate who receives a grade of *F* in a non-required course may retake the course once, from the same or a different instructor, but only within the next academic year. All failing and No Credit grades remain on the record. The cumulative average of a student includes all grades earned in courses evaluated on a letter-grade basis and taken at the Law School while a candidate for the degree.

The majority of courses are graded on a letter-grade basis, but for a small number of courses, primarily those that are clinical or skills-oriented, the grade of Credit or No Credit is given or the following grading scale is used: *H* (Honors), *P* (Pass), *LP* (Low Pass), and *NC* (No Credit). For Honors, a student must do work of excellent quality, and no more than 25 percent of the class may earn this grade. For courses graded on a Credit/No Credit or Honors, Pass, Low Pass, or No Credit basis, No Credit is given for work that would receive a grade below *C*− were evaluation to be made using the letter grade scale.

A student who has been excused from taking a regularly scheduled examination or has been granted an extension of the deadline for a research paper is given the grade of *I*, Incomplete. (See Failure to Take an Examination, and Research Paper Deadlines, below.)

No grade may be changed by an instructor after it has been posted or disclosed to the student unless there has been an arithmetic or administrative error certified in writing as such by the instructor. A student has the right of faculty peer review of complaints of "capricious or prejudiced academic evaluation" under the regulations outlined in ***The George Washington University Guide to Students' Rights and Responsibilities***.

Method of Evaluation

The method of evaluation is indicated at the end of each course description in this Bulletin, and a student's grade in the course will be determined in large part on that basis. In most courses, a final examination is held during the examination period. These courses are marked "examination." Additional written work requirements are indicated by notations such as "drafting assignments" or "problem assignments." A small number of courses are marked "take-home examination," indicating that the instructor will determine the method by which the examination is administered outside of the classroom.

Courses that require the preparation of a major research paper in lieu of an examination are marked "research paper." The satisfactory completion of such a paper by a student individually will satisfy the Legal Writing curriculum requirement for the J.D. degree. Some courses are marked "examination or research paper with permission of the instructor." In such cases an examination will be scheduled, but the instructor may grant permission for a number of students to write a research paper in lieu of the examination. Research papers satisfactorily completed in these courses will also satisfy the Legal Writing requirement for the J.D. degree.

Skills courses are usually graded on the basis of simulation, role-playing, and/or some form of written assignment and may be marked, for example, "drafting assignments" or "simulation and paper." In clinical courses no method of evaluation is indicated. In such courses it is the student's performance in carrying out his or her clinical responsibilities that forms the basis for the grade.

Participation—Once a student has been evaluated in a course using the method indicated in the course description, the instructor may raise or lower the student's grade on the basis of class participation. A student's grade may be raised or lowered by only one grade step for class participation, e.g., from *B* to *B+*, or *B* to *B−*.

Honors

The degree of Juris Doctor "With Highest Honors" is awarded to those students, not exceeding three percent of the graduating class, who have obtained the highest cumulative averages of at least 3.67.

The degree of Juris Doctor "With High Honors" is awarded to those students with the highest cumulative averages of 3.33 or better. The number of students receiving degrees "With High Honors," when added to the total number of students receiving degrees "With Highest Honors," may not exceed 10 percent of the graduating class.

The degree of Juris Doctor "With Honors" is awarded to those students with the highest cumulative averages of 3.0 or better. The number of students receiving degrees "With Honors," when added to the total number of students receiving degrees "With High Honors" and "With Highest Honors," may not exceed 40 percent of the graduating class.

For students who receive their degrees in September and January, eligibility for honors will be determined based upon the student's grade-point average in comparison with those students who graduated the previous May.

Order of the Coif

The Order of the Coif, a national legal honor society, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University chapter was established in 1926. Members are elected each year from the highest-ranking 10 percent of the graduating Juris Doctor candidates. Ordinarily, only students who have completed their full course of study in residence at the Law School are eligible for membership in the Order of the Coif. However, exceptions may be made by the Order of the Coif adviser for unusual circumstances. Any student admitted to the Law School as a transfer student after the first year of study will not be eligible. Similarly, students who take more than one semester of classes at another institution (excluding summer course work) will not be eligible.

Credit/No Credit Limit and Credit/No Credit Option

A number of the Law School's elective courses are graded on a Credit/No Credit basis or an Honors/Pass/Low Pass/No Credit basis. After the first year of study, students may take up to a total of 17 credit hours of courses graded on a Credit/No

Credit or Honors/Pass/Low Pass/No Credit basis. Credits earned in *Legal Research and Writing* (216) and *Introduction to Advocacy* (217) do not count toward the 17-hour limit.

The Credit/No Credit option allows J.D. students to take up to 6 credit hours of non-required law courses that are regularly graded on a letter-grade basis on a Credit/No Credit basis. Course credit earned under the Credit/No Credit option counts toward the 17-hour limit. In courses where the Credit/No Credit option has been elected, the following rules apply: (1) a student must earn a grade of *C*− or better to earn Credit; (2) the option may be elected for only one course during a semester or summer session; (3) the final day for an election of Credit/No Credit in a regularly graded course will be the Friday of the third week of a semester or summer session; (4) an unexcused failure to take an examination or submit a required research paper in a course taken on a Credit/No Credit basis will result in a grade of *F*.

Students are advised to consider carefully the advisability of electing to take courses on a Credit/No Credit basis. In the opinion of the faculty, a student's election to take courses on a Credit/No Credit basis may be detrimental to the student's career in the legal profession because of the importance usually attached to grades by educational institutions and employers.

Failure to Take an Examination

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. If a student fails to take an examination, a grade of *F* will be recorded unless the student has been excused from the examination or has obtained the dean's permission to drop the course. No excuse for absence will be granted except by the dean and then only for illness or other emergency. Application for excuse must be made in writing as soon as possible but not later than one month after the date of the examination. A student who has received an excused absence for a graded course will have the temporary grade of *I* (Incomplete) entered on the record and must elect, in writing, one of the following options. First, the student may comply with the instructor's procedure of evaluation (make-up examination, research paper, or other procedure, as determined by the instructor) to be graded on a Credit/No Credit basis (for credit, a minimum grade of *C*− is required for J.D. candidates) before the end of the semester following the excused absence. Second, the student may take the next regularly scheduled examination in the same course, taught by the same or a different instructor, for a letter grade. The examination, however, may not be taken after a student has been excluded for low scholarship, and permission to take an examination before the regularly scheduled date and time will not be granted. If the student fails to complete the elected option within the prescribed period, without an approved absence, the grade of *I* for the course will be changed to a grade of *F*.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to the next regular examination in the subject may petition the Academic Scholarship Committee, which may authorize such action as the circumstances require.

Research Paper Deadlines

The preparation of a research paper is required in most seminars and is offered as an option to an examination in a number of other courses, as indicated in the course descriptions. To receive a letter grade on a research paper, the paper must be submitted by the last day of classes in the semester or, with the permission of the instructor, by the last day of the examination period (the last day of any examination given in any course). In the summer session, the paper deadline will be determined by the instructor, but will be set no later than the last Friday before

fall semester classes begin. For sufficient reason, the instructor may extend the deadline up to the last day of the examination period of the following semester; if the extension is to a date beyond the normal graduation date for the student, the express permission of the dean is required. When a deadline for a paper is extended, the following conditions apply: (1) no student will receive any credit for the course for any purpose until a paper acceptable to the instructor has been submitted; (2) the only grade the student may receive for the course is *CR* (Credit) or *NC* (No Credit). To receive credit, a minimum grade of *C*− is required for J.D. candidates, unless the paper is intended to fulfill the legal writing requirement, in which case a minimum grade of *C* is required. Failure to submit any paper within the deadline will result in a grade of *F*.

Changes in Program of Study

Juris Doctor degree candidates may make changes in their class schedules during the first two weeks of classes. After that time, students may add or drop courses only with the written approval of the instructor, the associate dean for student affairs, and the director of the records office. Under no circumstances may a student drop a course after the last day of classes in any semester.

Attendance

Regular attendance at classes is required and is necessary for successful work. A student who is shown by the instructor to be deficient in class attendance or participation will, after the instructor first attempts to communicate with the student, have a grade of No Credit entered on the record absent an excuse. No excuse for deficient attendance or participation will be granted except by the associate dean for student affairs and then only for illness or other emergency. A student whose excuse is accepted by the associate dean for student affairs will be withdrawn administratively from the course.

Exclusion and Probation for Low Scholarship

A student whose cumulative average at the end of any semester falls below 1.67 but is above 1.6 will be put on probation. If such a student fails to raise the cumulative average to 1.67 at the end of the next semester, the student will not be permitted to register for any succeeding semester unless he or she petitions for and receives the permission of the Academic Scholarship Committee; however, all students will be allowed to complete the first two semesters of law study before being subject to such a probation.

A student whose cumulative average at the end of any semester falls below 1.6 will be excluded from further study unless the student petitions for and receives the permission of the Academic Scholarship Committee; however, all students will be allowed to complete the first two semesters of law study before being subject to such an exclusion.

A student who fails or receives a grade of No Credit more than once over the entire period of law study will be excluded from further study and may not graduate unless the student petitions for and receives the permission of the Academic Scholarship Committee. This rule applies to all students including those in their first year of study.

Students who are registered at the time they receive notice that they will not be permitted to continue their legal studies may receive a full refund of the tuition paid for the semester.

For this purpose the term "semester" includes the summer session.

Procedure for Reinstatement

Any student excluded may petition the Academic Scholarship Committee for reinstatement. The Committee will reinstate the student if he or she can demonstrate

(1) that the low grades were due to circumstances beyond his or her control and (2) that he or she has the capacity to pursue the study of law with a definite likelihood of success. The Committee may place conditions on a student's reinstatement; for example, the Committee may require that the student take specific courses, or it may place limits on outside employment.

Continuous Enrollment

Degree candidates are expected to maintain continuous enrollment until all degree requirements are satisfied. By failing to register for one semester or more, the student is dropped from the University's rolls and must be readmitted (see Readmission below). A student who has been granted a leave of absence must maintain continuous enrollment by paying the University registration fee and having the appropriate status noted at the time of registration.

Leave of Absence

After completion of the first year of study, a student may petition the dean for a leave of absence from the law school. A leave of absence will be granted only when the request is sufficiently compelling, and no leave of absence will be granted in excess of one academic year. A leave of absence during the first year of study may be granted in the case of a student's medically certified disability requiring absence from classes or a student's hospitalization and medically certified subsequent period of recovery. A student who has been granted a leave of absence must comply with the University's registration procedures for maintaining continuous enrollment. Any student who does not maintain continuous enrollment while on a leave of absence will be required to petition the Academic Scholarship Committee for readmission.

Visiting at Another Law School

A student whose personal circumstances necessitate leaving the Washington, D.C., area may be permitted to study at another ABA-accredited law school and apply the credits earned at that school toward his or her J.D. degree at the Law School. A student must petition the Academic Scholarship Committee and demonstrate that compelling personal circumstances warrant study at another institution. The Committee may grant one-semester visits on this basis. Permission to visit for two semesters is granted rarely, and only in the most extraordinary circumstances. In no event will the Committee allow more than 28 credit hours of study taken at another school to be counted toward the degree here. The courses to be taken at another law school must be approved in advance by the dean, and a student must earn a grade of *C*− or better (under the grading system of the other law school) to transfer the credit hours with a grade of Credit to the Law School. Students who register at another law school must provide the dean with an official transcript of their work there promptly on its completion.

Readmission

A student who was previously registered but did not attend during the most recent semester (summer session excluded), and who has not been granted a leave of absence, must apply to the Academic Scholarship Committee for readmission. A readmitted student is required to satisfy the curriculum requirements existing at the time of readmission.

Credit for Courses Taken in Other GW Schools

After the first year and with the approval of the dean, students may take a maximum of 6 credit hours of appropriate graduate-level courses in other schools of the University; a grade of at least *B*− must be received to obtain credit for such

courses; and the grade does not count in computing the cumulative average. Grades of Credit or No Credit resulting from courses taken in other schools will count toward the total of 17 hours allowed under the Credit/No Credit option.

Summer School Credit from Other Law Schools

Juris Doctor students may earn no more than a total of 6 credit hours from summer programs at other law schools toward their degree. Students planning to attend summer sessions at other law schools and intending to use the credit toward their Juris Doctor program at the Law School must first have the courses they wish to take approved by the dean. Students may not take courses in summer sessions at other law schools in this vicinity if the same courses are being given during the summer session at the Law School. A student must earn a grade of *C*− or better (under the grading system of the other law school) to transfer the credit hours with a grade of Credit to the Law School; and the grade does not count in computing the cumulative average. Grades of Credit or No Credit resulting from courses taken at other law schools during the summer will count toward the total of 17 hours allowed under the Credit/No Credit option. Credit will not be recognized in excess of that which can be obtained in a similar period at the Law School. Students who register at another law school must provide the dean with an official transcript of their work there promptly on its completion.

Joint Juris Doctor–Master's Degree Programs

The Law School offers joint degree programs with three other schools of the University. With the School of Public Health and Health Services, the J.D./M.P.H. is offered. Degrees offered with the School of Business and Public Management include the J.D./M.B.A. and J.D./M.P.A. Degrees offered with the Elliott School of International Affairs include the J.D./M.A. in the fields of international affairs; international development studies; security policy studies; science, technology, and public policy; international trade and investment policy; European studies; Russian and East European studies; East Asian studies; and Latin American studies.

Students must be admitted to both the Law School and, separately, to the school that will confer the master's degree. Each school must also independently approve a student's application to pursue a joint degree program. Once a student has been admitted to both schools as a joint degree candidate, the first year of study must be devoted exclusively to the prescribed law curriculum. After the first year of law studies, the Law School will allow 12 credit hours of work completed in the master's program to count toward completion of the 84 credits required for the law degree, making it possible to complete both degrees within four years. A number of other rules govern the joint degree programs. Students interested in entering one of the programs should consult with the appropriate admissions office.

Graduate Programs

The Law School offers advanced degree programs leading to the Master of Laws and Doctor of Juridical Science degrees for U.S. and foreign law school graduates. Both the LL.M. and S.J.D. programs offer an opportunity for attorneys to gain a more in-depth understanding of the law while engaging in scholarly research.

The Master of Laws Degree

The Master of Laws candidate may follow a program of general study and design an individual program or may concentrate in one of the specialized fields listed below. Graduates who complete their work in one of these areas may have the field of specialization noted on their diplomas.

Environmental Law
Government Procurement Law
Government Procurement and Environmental Law
Intellectual Property Law
International and Comparative Law
International Environmental Law
Litigation and Dispute Resolution

Entrance Requirements

For applicants with a U.S. law degree, a Juris Doctor or equivalent degree is required from a law school that is a member of the Association of American Law Schools or is approved by the American Bar Association. The applicant must have demonstrated a high degree of academic excellence in earning the first law degree.

Foreign law school graduates must have completed a law degree with high academic standing from a recognized foreign university. Foreign law school graduates may also need to meet the minimum language test requirement (see below).

Advanced standing is not granted for credit earned while a candidate for the first law degree or for credit earned at any time before the student was a degree candidate in the LL.M. program at the Law School. An exception may be made in the case of students who earn credit through the Oxford–GW International Human Rights Law Program and who subsequently are admitted to LL.M. degree candidacy in the area of International and Comparative Law.

Admission

U.S. Law School Graduates

Application forms are available at and should be returned to the Graduate Programs Office, The George Washington University Law School, Washington, D.C. 20052. Applications are due by June 1 for the fall semester, November 1 for the spring semester, and one month prior to the beginning of the summer session for which application is made.

Foreign Law School Graduates

Application forms are available at and should be returned to the International Graduate Programs Office, The George Washington University Law School, Washington, D.C. 20052. Applications are due by May 1. Foreign law school graduates are admitted for the fall semester only.

Test of English as a Foreign Language (TOEFL)

Students from countries where English is not an official language are required to take the Test of English as a Foreign Language and attain a score in the 600-point

range to be considered for admission at the Law School. This is a mandatory requirement. Applicants are responsible for making arrangements for taking the test and should address inquiries to TOEFL, Educational Testing Service, P.O. Box 6154, Princeton, New Jersey 08541, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission. The test fee, which should be remitted with the application, entitles the student to have the test score sent to three institutions. Registration for the Test of English as a Foreign Language does not constitute application for admission to The George Washington University.

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test; lists of examination centers; examination dates; and an application blank. On the application for the test, the student should specify that the scores be sent to the Law School's International Graduate Programs Office.

Degree Requirements

U.S. Law School Graduates

In order to earn the Master of Laws degree, U.S. law school graduates must fulfill the following requirements: completion of 24 credit hours, including the required curriculum in the specialized programs (see Curriculum, below); attendance for a residence period of a minimum of two consecutive semesters; achievement of a cumulative grade point average of 2.67 at the time all requirements are met; and completion and acceptance of a thesis (except for candidates for the degree in Litigation and Dispute Resolution).

U.S. students who are full time (those enrolled for 9 or more credit hours per semester) must complete all degree requirements within one calendar year of matriculation; those who are part time (enrolled for 8 or fewer credit hours per semester) must complete all degree requirements within two calendar years of matriculation. Determination of the applicable time limit will be made on the basis of the number of credit hours for which the student enrolls in the first semester of his or her degree program. Extensions of these time limits for completion of the thesis requirement may be granted under appropriate circumstances (see Thesis Requirement, below).

Foreign Law School Graduates

In order to earn the Master of Laws degree, all foreign law school graduates must fulfill the following requirements: completion of 24 credit hours, including the required curriculum in the specialized programs (see Curriculum, below); attendance for a residence period of a minimum of two consecutive semesters; achievement of a cumulative grade-point average of 2.33 at the time all requirements are met (2.67 for foreign attorneys who previously earned an LL.M. from a U.S. law school); completion and acceptance of a thesis unless this requirement has been waived (see Thesis Requirement, below); and completion of Law 994, *Introduction to American Law*.

Foreign law school graduates are expected to complete all degree requirements in one academic year. An extension for one semester may be granted by the program director in exceptional circumstances.

Thesis Requirement

With the exception of foreign law school graduates whose thesis requirements are governed by the regulations listed below and candidates for the degree in Litigation and Dispute Resolution who do not have a thesis requirement, each candidate for the LL.M. degree must write a master's thesis under the supervision of a

full-time member of the Law School faculty. The thesis is expected to be a scholarly paper of the same quality and length as a law review article.

Full-time students take Law 690–91, *Thesis*, during the first and second semesters of their program; part-time students, during their third and fourth semesters. With the approval of the program director or thesis adviser, an extension of up to one calendar year may be granted for completion of the thesis; continuous enrollment must be maintained during the period of the extension. Those who, due to extraordinary circumstances, require an extension beyond one calendar year, must receive approval from the program director and the associate dean for academic affairs; continuous enrollment must be maintained.

Foreign Law School Graduates—Only foreign law school graduates who are candidates for the LL.M. degree may request a waiver of the thesis requirement. A candidate for the degree in a specialized field must submit the request in writing to the director of the program in that field. A student in the General LL.M. program must submit the request to the director of the International and Comparative Law Program. All requests for a thesis waiver must be submitted no later than the beginning of the final semester or summer session before the student's graduation. Approval of such a request will be granted only if the student has demonstrated research and writing ability by successfully completing a substantial research paper in a course or as an independent writing project.

Curriculum

All candidates for the LL.M. complete 24 credit hours, including 4 hours of thesis for those students who are subject to the thesis requirement (see above). Those working toward the General LL.M. should consult with the appropriate program director or dean in order to design a comprehensive program of study; students may choose to concentrate their studies in one or more areas, such as constitutional law, labor law, corporate law, and health care law. Those working toward a specialized program must complete the minimum required number of hours in courses listed below for each program. Related courses are recommended for the remaining course work. Specialized degree candidates must have their programs of study approved by the program director.

Environmental Law Program

Directors A.W. Reitze, Jr., L. Hourclé; *Faculty Adviser* J. Turley

The Environmental Law Program offers programs of study in three specialized fields—Environmental Law, Government Procurement and Environmental Law, and International Environmental Law. Course requirements for each field of specialization are given below:

LL.M. in Environmental Law—
A minimum of 12 credits is required from the following courses:

Air Pollution Control (432)
Environmental Law Enforcement (433)
Water Pollution Control (434)
International Trade and Environmental Law (435)
Water Resources Law (436)
Coastal, Navigation, and Wetlands Resource Law (437)
Energy Law (438)
Natural Resources Law (440)
Regulation and Management of Ecosystems (441)
Control of Solid and Hazardous Wastes (RCRA & CERCLA) (442)
Regulation of Pesticides and Industrial Chemicals (FIFRA & TSCA) (444)
Nuclear Energy Law (446)
Occupational Safety and Health Legislation (448)
Toxic Tort Litigation (449)
Federal Facilities Environmental Law Issues (450)
Environmental Issues in Business Transactions (452)
International Environmental Law (454)

Environmental Planning (456)
Environmental Negotiations (458)
Environmental Compliance and Enforcement Mechanisms (463)
Environmental Crimes (464)
Environmental Crimes Project (465)
Environmental Law Seminar (466)
Graduate Environmental Placement (468)
Government Contracts and Environmental Law Seminar (507)

LL.M. in Government Procurement and Environmental Law—
The following courses are required:

Air Pollution Control (432)
Environmental Law Enforcement (433)
Water Pollution Control (434)
Control of Solid and Hazardous Waste (RCRA & CERCLA) (442)
Formation of Government Contracts (502)
Performance of Government Contracts (503)
Government Contracts Cost and Pricing (506) *or* Government Contracts and Environmental Law Seminar (507)

LL.M. in International Environmental Law—
The following courses are required:

Air Pollution Control (432)
Water Pollution Control (434)
Control of Solid and Hazardous Waste (RCRA & CERCLA) (442)
International Environmental Law (454)
International Trade and Environmental Law (435)
International Law (520)
International Business Transactions (522) *or* International Organizations (530)

Courses Related to Environmental Law

Complex Litigation (236)
Land Use Law (332)
Products Liability (354)
Administrative Law (400)
Regulated Industries (406)
Legislative Analysis and Drafting (418)
Government Contracts (500)
Formation of Government Contracts (502)
Law of the Sea (550)
Mediation (646)

Government Procurement Law Program

Directors J. Schwartz, F.J. Lees; *Faculty Adviser* S. Schooner

LL.M. in Government Procurement Law—
A minimum of 10 credits is required from the following courses:

Government Contracts (500)
Formation of Government Contracts (502)
Performance of Government Contracts (503)
Government Contracts Cost and Pricing (506)
Government Contracts and Environmental Law Seminar (507)
Comparative Public Procurement (508)
Government Contracts Seminar (509)
Graduate Government Contracts Placement (510)

Courses Related to Government Procurement Law

Federal Courts (232)
Labor Law (266)
Labor Standards (274)
Business Planning (296)
Corporate Taxation (302)
Employment Discrimination Law (390)
Administrative Law (400)
Antitrust Law (402)
Unfair Trade Practices (404)
Legislation (416)
Legislative Analysis and Drafting (418)
Government Lawyering Seminar (420)
Local Government Law (422)
Public Law Seminar (426)
Environmental Law (430)
Nuclear Energy Law (446)

Patent Law (470)
International Business Transactions (522)
International Commercial Law (524)
Law and Economics (598)
Public Economic Policy and the Law (600)
Law and Accounting (602)
Quantitative Analysis for Lawyers (604)
Mediation (646)
Alternative Dispute Resolution (647)
Negotiations (648)

Intellectual Property Law Program

Acting Director M. Adelman

LL.M. in Intellectual Property Law—
A minimum of 10 credits is required from the following courses:

Patent Law (470)
Copyright Law (472)
Trademark Law (474)
Patent Policy and Practice (476)
Licensing of Intellectual Property Rights (478)
Chemical and Biotech Patent Law (480)
Patent Enforcement (482)
Computer Law (484)
Biotechnology Patent Policy (486)
Japanese Patent Policy (488)
International and Comparative Patent Law (490)
Intellectual Property Antitrust Seminar (494)
Intellectual Property Law Seminar (496)
Intellectual Property Issues Short Seminar (498)

Courses Related to Intellectual Property Law

Antitrust Law (402)
Unfair Trade Practices (404)
Formation of Government Contracts (502)

International and Comparative Law Program

Director R. Steinhardt; *Faculty Advisers* R. Bhala, T. Buergenthal, J.A. Spanogle

LL.M. in International and Comparative Law—
A minimum of 12 credits is required from the following courses:

International Taxation I (312)
International Taxation II (313)
International Law (520)
International Business Transactions (522)
International Commercial Law (524)
International Trade Law (526)
Advanced International Trade Law (527)
International Litigation (528)
International Organizations (530)
Comparative Law (532)
Law of the European Union (534)
Law of Japan (536)
Traditional Jewish Civil Law (537)
Immigration Law I (538)
Immigration Law II (539)
International Banking (542)
Foreign Direct Investment (544)
International Law of Human Rights (546)
Air and Space Law (548)
Law of the Sea (550)
International Law of Territory (551)
Law of War (552)
International Law, Ethics, and Conflict (553)
International Criminal Law (554)
International Arbitration (556)
International Negotiations (558)
Public International Law Seminar (562)
International Business Transactions Seminar (564)
Human Rights Lawyering (568)

GW–Oxford International Human Rights Law Program Courses

The following courses are offered as part of the GW–Oxford International Human Rights Law Program, which is held in summer at the University of Oxford. Credit earned in these courses may be applied toward LL.M. program requirements in International and Comparative Law.

The New Due Process (570)
Comparative Human Rights Institutions (572)
Human Rights and Refugee Law (574)
International Rights of Women (576)
Human Rights Advocacy and Dissemination (578)
Individual and Group Rights (580)
Humanitarian Law and Populations at Risk (582)

Courses Related to International and Comparative Law

Conflict of Laws (234)
Admiralty (293)
International Trade and Environmental Law (435)
Nuclear Energy Law (446)
International Environmental Law (454)
International and Comparative Patent Law (490)
Comparative Public Procurement (508)
Immigration Law (538)
Refugee and Asylum Law (540)

Litigation and Dispute Resolution Program

Director S.A. Saltzburg; *Associate Director* A. Robinson

LL.M. in Litigation and Dispute Resolution—
A minimum of 24 credits is required from the following courses:

Advanced Trial Advocacy (675)
Mediation and Alternative Dispute Resolution (676)
Pre-Trial Practice in Civil Cases (677)
Ethics in Adjudication and Settlement (678)
Advanced Evidence (679)
The American Jury (680)
Negotiation and Conflict Management Systems Design (681)
International Dispute Resolution (682)
The College of Trial Advocacy (683)

Joint LL.M./M.P.H. Degree

Candidates for the LL.M. in Environmental Law may pursue a joint LL.M./M.P.H. degree. Admission must be obtained separately to the LL.M. program and to the Master of Public Health program in the GW School of Public Health and Health Services. Each school must also independently approve a student's application to pursue a joint degree program. To be admitted, applicants must have a strong legal background and substantial training in science. More information about the requirements for the joint degree program may be obtained from the admissions offices of each school.

Academic Regulations

Academic Work Load

Master's candidates without substantial outside employment may take a maximum of 12 credit hours per semester. Students with more than 20 hours of outside employment must take a limited program of study not to exceed 8 credit hours. The minimum load is 4 credit hours unless approval for fewer hours is given by the dean.

Academic Evaluation

Grades

Letter grades are given with numerical equivalents as follows.

A+ = 4.33	B+ = 3.33	C+ = 2.33	D = 1.0
A = 4.0	B = 3.0	C = 2.0	F = 0
A− = 3.66	B− = 2.66	C− = 1.66	

Graduate students may not elect to take graded courses on a Credit/No Credit basis. No credit is given for grades below *C*− for U.S. law school graduates in the

program and for grades below *D* for foreign law school graduates. A student who has been excused from taking a regularly scheduled examination or has been granted an extension of the deadline for a research paper is given the grade of *I*, Incomplete. (See Failure to Take an Examination, and Research Paper Deadlines, below.)

The cumulative average of a student includes all grades in all courses taken while a candidate for a given degree.

No grade may be changed by an instructor after it has been posted or disclosed to a student unless there has been an arithmetic or administrative error that has been certified in writing by the instructor. A student has the right of faculty peer review of complaints of "capricious or prejudiced academic evaluation" under the regulations outlined in *The George Washington University Guide to Students' Rights and Responsibilities*.

Method of Evaluation

The method of evaluation is indicated at the end of each course description in this Bulletin, and a student's grade in the course will be determined in large part on that basis. In most courses, a final examination is held during the examination period. These courses are marked "examination." Additional written work requirements are indicated by notations such as "drafting assignments" or "problem assignments." A small number of courses are marked "take-home examination," indicating that the instructor will determine the method by which the examination is administered outside of the classroom.

Courses that require the preparation of a major research paper in lieu of an examination are marked "research paper." Some courses are marked "examination or research paper with permission of the instructor." In such cases an examination will be scheduled but the instructor may grant permission for a number of students to write a research paper in lieu of the examination.

Skills courses are usually graded on the basis of simulation, role-playing, and/or some form of written assignment and may be marked, for example, "drafting assignments" or "simulation and paper."

Participation—Once a student has been evaluated in a course using the method indicated in the course description, the instructor may raise or lower the student's grade on the basis of class participation. A student's grade may be raised or lowered by only one grade step for class participation, e.g., from *B* to *B+*, or *B* to *B−*.

Special examination procedures for foreign law school graduates—All LL.M. degree candidates whose initial law degree was earned from a foreign law school where the primary language of instruction is not English are entitled to an extra hour when taking their examinations and may use a bilingual dictionary during the examination, except for the following: (1) students whose native language is English; (2) students who have obtained a waiver of the TOEFL requirement for purposes of admission; (3) students who have earned a J.D. or equivalent degree from an ABA-accredited law school.

Honors

The degree of Master of Laws "With Highest Honors" is awarded students who obtain a minimum cumulative average of 3.67.

Failure to Take an Examination

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. If a student fails to take an examination, a grade of F will be recorded unless the student has been excused from the examination or has obtained the dean's permission to drop the course. No excuse for absence will be granted except by the dean and then only for illness or other emergency. Application for excuse must be made in writing as soon as

possible but not later than one month after the date of the examination. A student who has received an excused absence for a graded course will have the temporary grade of *I* (Incomplete) entered on the record and must elect, in writing, one of the following options. First, the student may comply with the instructor's procedure of evaluation (make-up examination, research paper, or other procedure, as determined by the instructor) to be graded on a Credit No Credit basis (for credit, a minimum grade of *C*− is required for LL.M. candidates) before the end of the semester following the excused absence. Second, the student may take the next regularly scheduled examination in the same course, taught by the same or a different instructor, for a letter grade. The examination, however, may not be taken after a student has been excluded for low scholarship, and permission to take an examination before the regularly scheduled date and time will not be granted. If the student fails to complete the elected option within the prescribed period, without an approved absence, the grade of *I* for the course will be changed to a grade of *F*.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to next regular examination in the subject may petition the Graduate Studies Board, which may authorize such action as the circumstances require.

Research Paper Deadlines

The preparation of a research paper is required in lieu of an examination in seminars and other courses, as indicated in the course descriptions. To receive a letter grade on a research paper, the paper must be submitted by the last day of classes in the semester or, with the permission of the instructor, by the last day of the examination period (the last day of any examination given in any course). In the summer session, the paper deadline will be determined by the instructor, but can be set no later than the last Friday before fall semester classes begin. For sufficient reason, the instructor may extend the deadline up to the last day of the examination period of the following semester; if the extension is to a date beyond the normal graduation date for the student, the express permission of the dean is required. When the deadline for a paper is extended, the following conditions apply: (1) no student will receive any credit for the course until a paper acceptable to the instructor has been submitted; (2) the only grade the student may receive for the course is *CR* (Credit) or *NC* (No Credit). To receive credit, a minimum grade of *C*− is required for LL.M. candidates. Failure ultimately to submit any paper for the course will result in a grade of *F*.

Changes in Program of Study

Master of Laws candidates may make changes in their class schedules during the first two weeks of classes. After that time, students may add or drop courses only with the written approval of the instructor, the associate dean for student affairs, and the director of the Records Office. Under no circumstances may a student drop a course after the last day of classes in any semester.

Credit for Courses Taken in Other GW Schools

Master of Laws candidates may be permitted to take graduate courses related to their fields of interest in other schools of this University. A maximum of 6 credit hours will be credited toward the degree for such courses. The grade of *CR* (Credit) or *NC* (No Credit) will be recorded for such courses; a student must earn a grade of at least *B*− to receive a grade of Credit.

Consortium of Universities of the Washington Metropolitan Area, Inc.

A candidate for the Master of Laws degree may take graduate courses at Georgetown University Law Center through the Consortium of Universities of the

Washington Metropolitan Area. A maximum of 6 credit hours of such courses may be credited toward the master's degree. Permission to take Consortium courses must be granted by the dean, the registrar, and the instructor offering the course. The grade of *CR* (Credit) or *NC* (No Credit) will be recorded for such courses. To receive the grade of *CR* a student must attain a grade of *C*– or higher.

Readmission

A student who fails to register for one or more semesters will be required to apply for readmission in order to continue in the degree program. Application for readmission should be made to the Graduates Studies Board. Readmitted students will not receive academic credit for course work completed more than five years prior to the date of the readmission request. Petitions for exceptions to this policy should be addressed to the Graduate Studies Board and will be granted only in exceptional circumstances.

Attendance

Regular attendance at classes is required and is necessary for successful work. A student who is shown by the instructor to be deficient in class attendance or participation will, after the instructor first attempts to communicate with the student, have a grade of No Credit entered on the record absent an excuse. No excuse for deficient attendance or participation will be granted except by the associate dean for student affairs and then only for illness or other emergency. A student whose excuse is accepted by the associate dean for student affairs will be withdrawn administratively from the course.

Because the courses in the Litigation and Dispute Resolution degree program are evaluated strictly on the basis of the student's performance in class, any student enrolled in Law 675, 676, 677, 678, 679, 680, 681, 682, or 683 who misses more than three class meetings will receive a grade of No Credit (*NC*) unless the student can demonstrate to the satisfaction of the program director that the absences were for good reason and beyond the student's control. In such a case, the student will be withdrawn administratively from the course. The student may repeat the course at its next offering by registering and paying the tuition. However, the grade of *NC* will remain on the record.

The Doctor of Juridical Science Degree

Programs leading to the degree of Doctor of Juridical Science offer a very small number of unusually talented students, who have already earned the Master of Laws degree, the opportunity to concentrate on research and writing in a specific area of interest.

Entrance Requirements

U.S. Law School Graduates

For S.J.D. applicants who earned their first law degree from a U.S. law school, the following requirements pertain. Applicants must hold a B.A. or equivalent degree from a regionally accredited college or university and a J.D. and an LL.M. or equivalent degrees, both earned with excellent records, from law schools that are members of the AALS or approved by the ABA. (The requirement for an LL.M. may be waived in exceptional circumstances.) Applicants must submit copies of their master's thesis or one or more papers or articles they have written. Applicants must include a research proposal and dissertation topic approved by a full-time member of the Law School faculty who has agreed to serve as the faculty adviser if the applicant is admitted.

Foreign Law School Graduates

For S.J.D. applicants who earned their first law degree at a foreign law school, the following entrance requirements pertain. Applicants must have graduated with an excellent academic record from a foreign law school known for high academic standards, such a determination will be made by the International Graduate Programs Office or by a qualified faculty member. As outlined above for U.S. law school graduates, additional requirements include an LL.M. (which may be waived in exceptional circumstances), copies of the master's thesis or one or more papers or articles written by the applicant, and a research proposal and dissertation topic approved by a full-time member of the Law School faculty who has agreed to serve as the faculty adviser if the applicant is admitted. Consideration for admission requires proficiency in the English language, both oral and written, as determined by the International Graduate Programs Office or by a faculty member designated by the dean.

Degree Requirements

Candidates for the Doctor of Juridical Science degree must complete the following requirements in order to be awarded the degree: a residence period of not less than one academic year, a course of study and research, designated by the dissertation committee, of no less than 8 credit hours, and completion and acceptance of a dissertation (see below).

The course work for the S.J.D. degree will normally be completed during the first two years of study. During this period, tuition is paid in four equal payments and no limit is placed on the number of credit hours for which a degree candidate may enroll with his or her adviser's approval. After the first two years from the date of matriculation, tuition will be charged by the credit hour for any additional courses taken by the degree candidate, either for credit or as an auditor.

The Dissertation

The dissertation must be submitted no later than three years from the date of admission to candidacy for the S.J.D. degree. The applicant who proposes to write on a comparative law topic must have a reading knowledge of the language in which the relevant materials are to be found. When the dissertation is submitted, the consultative committee will set the date for oral examination. This examination is conducted by the consultative committee and such other members of the faculty and qualified experts as are selected by the appropriate program director in consultation with the dean.

No later than one month before the expected date of graduation, the candidate must submit to the dean two complete copies of the dissertation and two copies of an abstract of the dissertation.

To be acceptable, the dissertation must, in the opinion of the examining committee, constitute a substantial contribution to the field of law concerned and be suitable for publication. Additional information will be supplied by the dean. Accepted dissertations become the property of the University and are placed in the University's Gelman Library and the Jacob Burns Law Library, where duplicate copies are bound and made available for circulation.

Fees and Financial Regulations

The following fees and financial regulations were adopted for the 1998 summer session and the 1998–99 academic year.

Tuition Fees

J.D. candidates:	
Full-time program (11 or more credit hours per semester), for the academic year	$22,920
Part-time program, each credit hour	808
Master's degree candidates, each credit hour	808
Continuing Legal Education students, each credit hour	808
S.J.D. candidates,* full program, including the final examination	22,920*

University Fee (charged all students registered on campus)—$34.50 per credit hour, to a maximum of $517.50 per semester.

Special Fees and Deposits (Nonrefundable)	
Application fee (degree candidate)	55
Tuition deposit fee charged each student admitted to J.D. degree candidacy (payable in two installments—$100 by a date specified in the letter of admission; $1,000 by mid-June)	1,100
Tuition deposit fee charged each student admitted to LL.M. degree candidacy (payable on the date specified in the letter of admission)	500
Late registration beginning the first week of the semester	80
Registration for continuous enrollment or leave of absence	35
Graduation fee	100
Fee for binding master's theses and S.J.D. dissertations	30
Late-payment fee (see Payment of Fees, below)	75
Replacement of lost or stolen picture identification card	25
Returned check fee, charged a student whose check is returned because of insufficient funds or for any other reason	25
Transcript fee	5
Replacement of diploma fee	50

Registration on campus in the University entitles each student to the following privileges: the services of the Career Center; the use of the University library; gymnasium privileges; and admission to all athletic contests, unless otherwise specified. These privileges terminate and a student is no longer in residence upon withdrawal or dismissal from the University.

Payment of Fees

A student who registers for classes in any semester or session incurs a financial obligation to the University. Payment of tuition and fees, as detailed on the Schedule and Invoice, is due approximately two weeks prior to the first day of classes. Changes to registration that affect charges to the student's account must be recorded through the Office of the Registrar. In addition to payment of tuition and fees, the University requires that a student confirm his or her registration. Students whose registrations are not confirmed by the third week of the semester may be canceled from all courses. Receipt of the tear-off portion of the Schedule and Invoice, typically mailed with the student's payment, is

*The tuition fee is to be paid at the rate of $5,730 per semester for four successive semesters, exclusive of the summer term or terms. If the faculty should approve an extension of time, the student must maintain continuous enrollment. After the first two years from the date of matriculation, tuition will be charged by the credit hour for any additional courses taken by the degree candidate, either for credit or as an auditor.

requested for confirmation of registration. All students whose registrations are not confirmed are notified in writing that their registrations will be canceled and are asked to contact the Student Accounts Office immediately.

Charges for residence halls and meal plans are in accordance with lease agreements signed by the student. Questions concerning those charges should be referred to the Community Living and Learning Center.

The University offers several options for payment of tuition and fees in addition to payment in full upon receipt of the Schedule and Invoice or at the time of registration.

Deferred Payment Plan—Any student registered for 6 or more credit hours may be eligible to participate in this plan. Advance arrangements are not required. Students who receive GW employee tuition benefits or departmental tuition awards are not eligible to participate in this plan unless the student's balance after awards are deducted is greater than $3,000. An eligible student may use the deferred payment plan by paying the minimum amount due for the semester as specified. The remaining balance plus accrued interest is due by the eighth week of classes. Interest on unpaid balances is charged at the rate of 12% per annum beginning the first day of classes each semester. If payment in full is not received by the end of the eighth week of the semester, interest will continue to accrue at the rate previously stated and the account will be assessed a $50 late payment fee.

Monthly Payment Plan—The University's payment plan is open to all students and is available for the fall and spring semesters only. Students must complete and submit an application by August 15 for the academic year or by January 5 for the spring semester to participate in the plan. Upon approval of the application, the University will furnish coupons and return address labels for each payment. The monthly payment plan for the academic year begins in June and ends in March, with the first five payments applied to the fall account and the second five applied to spring. For spring semester only, the plan begins in November and ends in March. Under the plan, all payments are due on the first of each month. The student will receive a monthly bill, but no interest or late fees will be charged provided payments are received as scheduled. Students who enroll in the plan after the first month must make up all payments to the month of enrollment. Interest and a $50 late payment fee are assessed all accounts not paid in full by October 1 for fall and March 1 for spring.

Third-Party Billing—The University accepts employer vouchers or purchase orders that are not contingent upon receipt of grades. Under all circumstances, however, the charges for tuition and fees remain the responsibility of the student. Should a sponsor fail to remit payment to the University, the University will contract the student for payment. A student whose employer or sponsor reimburses him or her for tuition and fees after receipt of grades must pay in full by the stated due date to avoid interest, late fees, and/or cancellation of registration. Students whose tuition is paid in full or part by employee benefits or teacher tuition remission must pay any remaining balance by the stated due date to avoid interest, late fees, and/or cancellation of registration.

Accounts that are past due are encumbered by the University. A student whose account is encumbered may not register for future semesters and may not receive diplomas or transcripts. Accounts that are more than 90 days past due are referred to an agency for collection. The student is then responsible for all charges due the University as well as all collection costs incurred by the agency.

A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee.

Withdrawals and Refunds

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the dean. Withdrawal from courses is permitted after the midpoint of a semester only in extraordinary circumstances. Notification to an instructor is not an acceptable notice.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. *Complete withdrawal* from the University:
   Withdrawal dated on or before the end of the first week of the semester 80%
   Withdrawal dated on or before the end of the second week of the semester 60%
   Withdrawal dated on or before the end of the third week of the semester 40%
   Withdrawal dated on or before the end of the fourth week of the semester 25%
   Withdrawal dated after the fourth week of the semester . . . . . None
2. *Partial withdrawal:* If the change in program results in a lower charge, the refund schedule above applies to the difference.
3. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

The above information regarding cancellation of tuition charges and fees after withdrawal from the University may not apply to entering students who are recipients of federal aid; those students should check with the Student Accounts Office for the applicable cancellation schedule.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education.

In no case will tuition be refunded or reduced because of absence from classes.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

Financial Aid

The Law School assists many students in obtaining financial aid through grants, various federal and commercial loan programs, or a combination of these kinds of assistance.

Juris Doctor Program

Entering students wishing to receive financial aid from the Law School must register with the College Scholarship Service's Profile Service and file the Free Application for Federal Student Aid (FAFSA) form. The FAFSA is available at most college financial aid offices. For Profile, students register by calling a toll-free number; CSS then sends to the student a full Profile application. Both the FAFSA and Profile application should be completed as soon as possible after filing federal tax returns. The information provided by the applicant and his or her parents will be analyzed by CSS, and a financial need report will be sent to the Law School. A copy of all pages, schedules, and W-2s of the student's and the student's parents' federal income tax returns, and a financial aid transcript from each U.S. college or university attended, regardless of whether the student received aid, must also be submitted to the Financial Aid Office.

University funds will be awarded on the basis of financial need. In determining need, the Financial Aid Office considers all data from the Profile, FAFSA, financial aid transcripts, and tax returns. The Committee on Student Financial Aid of the Law School begins making awards in March; available funds are limited. No awards will be offered to an applicant until the admission process has been completed. Additional information concerning financial aid may be obtained from the Law School's Financial Aid Office.

Sources of Financial Aid

Financial aid has been made available from many friends and alumni of the Law School. The scholarships include the following:

Arnold and Porter Scholarship
Donald W. Banner Scholarship
Mildred Gott Bryan Scholarship
Jacob Burns Honor Scholarship
Alan Dershowitz Fellowship Fund
Charles Worthington Dorsey Memorial Scholarship
Lori and Dan Efroymsom Scholarship Fund
Zafanoff Family Foundation Scholarship
Samuel Green Phi Delta Phi Scholarship
Patricia Roberts Harris Scholarship
William Hedeman Memorial Scholarship
Harvey and Simon Scholarship
Hinton and Williams Scholarship
Thomas Searing Jackson Scholarship Fund
Jacob and Charlotte Lehrman Foundation Scholarship
Nathan Lewin Fellowship Fund
Loughran Foundation Fund
Manatt–Phelps Banking Law Scholarship
Leah Brock McCartney Scholarship
Robert Netherland Miller Scholarship
Phi Delta Delta Scholarship
Donald C. Snyder Scholarship
L. Marie Van Hise Scholarship
Frank S. Whitcomb Scholarship
Glen A. Wilkinson Scholarship
J. McDonald and Judith K. Williams Scholarship
Willian Brinks Olds Hofer Gilson & Lione Scholarship Fund

Public Interest Support Funds

Jacob and Charlotte Lehrman Foundation Scholarship—A third-year student in the clinical program is selected annually to serve as a student director, performing administrative duties in connection with the Administrative Advocacy and

Civil Litigation Clinics. The student director assigns and supervises student caseloads, controls client intake, and acts as a liaison between law students and staff attorneys. The recipient of the scholarship receives a grant for partial tuition.

J.B. and Maurice C. Shapiro Public Service Internships—Shapiro Public Service Internships are provided to students who work without compensation for a nonprofit public service organization in the Washington metropolitan area in the summer between the first and second year. These awards are intended to encourage students to pursue careers in public service, enabling them to gain practical experience in the field of public service while providing public service organizations with the help they otherwise might not be able to afford. Recipients are selected on the basis of academic merit and demonstrated commitment to public service; financial need is a secondary consideration.

J.B. and Maurice C. Shapiro Public Service Fellowships—Shapiro Public Service Fellows are selected on the basis of academic merit and commitment to public service, as demonstrated during their first two years of law school. As a secondary consideration, the amount of each award reflects the student's financial need. These awards make it possible for third-year students to pursue part-time public interest employment that offers little or no compensation. Each recipient is required to work approximately 20 hours per week during his or her third year of law school, serving a nonprofit public service organization in the Washington metropolitan area.

Loan Reimbursement Assistance Program—The Law School provides assistance in repayment of legal education debt through its Loan Reimbursement Assistance Program. J.D. program graduates with educational debt who choose public interest employment may receive grants of up to $6,000 per year. Grant awards will depend on the nature of the employment, the applicant's commitment to public interest work, the applicant's and employer's financial need, and the amount of the applicant's educational debt. The number and size of grants varies from year to year, depending on the number of applications and the availability of funds.

Public Interest Fellowship Program—In order to support public interest work, the Law School awards ten fellowships each year to J.D. students who take low-paying public interest jobs over the summer. The fellowship award is in the form of a tuition reduction in the following fall semester.

Loan Funds

Through the generosity of friends of the University, a number of loan funds are available. Among them are the Lyle T. Alverson Loan Fund; the Robert Ash Loan Fund; the George R. Beneman Loan Fund; the Morris and Gwendolyn Cafritz Foundation Minority Law Student Loan Fund; the Robert M. and Mary McConnel Cooper Loan Fund; the Robert McKinney Cooper Memorial Loan Fund; the Mitchell S. Cutler Memorial Loan Fund, the J. Forrester Davison Loan Fund, the Clifford A. Dougherty Fund; the District of Columbia Bar Association Loan Fund; the J.W. Ehrlich Foundation Loan Fund; the Newell W. Ellison Loan Fund; the Louise F. Freeman Memorial Student Loan Fund; the Harold L. and Violet George Foundation Loan Fund; the George Washington Law Association Loan Fund, the Morris Golub Loan Fund; the Frederick O. Graves Law Student Loan Fund, the John B., Jr., and Carol H. Holden Loan Fund; the Jephson Educational Trust Loan Fund; the Susan and Anne Kondrup Memorial Fund; the Law Association Loan Fund for the law classes of 1912, 1918, 1921, 1924, 1929, 1931, 1933, 1935, 1936, 1937, 1938, 1939, 1941, 1942, 1945, 1950, 1951, 1952, 1953, 1955, 1959, 1960, 1961, 1962, 1963, 1964, 1965; the Law School Loan Fund; the Oscar Lawler Memorial Loan Fund; the Horace L. Lohnes Memorial Assistance Fund; the Jessie B. Martin Loan Fund, the Robert N. Miller Loan Fund, the Joan Murphy Loan Fund, the Nu Chapter, Kappa Beta Pi Legal Association International Loan Fund; the Mike Pelekiri Loan Fund, the Phi Delta Delta Loan Fund; the W. Theodore Pierson Loan

Fund; the Rockport Loan Fund; the Samuel L. Samuel Loan Fund; the H. William Tanaka Law Students Assistance Loan Fund; the Orville Hassler Walburn Memorial Loan Fund; the Kennedy and Judith Watkins Law Student Loan Fund; the Ralph E. West Memorial Loan Fund, the W.H. Williams Memorial Student Loan Fund; the Patricia A. Willoner Loan Fund; the Ruth E. Wilson Loan Fund; the Yadao and Kanemoto Loan Fund; and the Samuel Green Memorial Loan Fund.

Master's and Doctoral Programs

Sources of financial aid include the Richard Paul Momsen Scholarships for Brazilian Graduate Law Students for the study of U.S. constitutional law and the law of patents and trademarks, the Randolph C. Shaw Graduate Fellowship in Environmental Law, the Randolph C. Shaw Fellowship in a field related to administrative law, the Honorable Gerald J. Mossinghoff Fellowship for graduate research in intellectual property law, and Graduate Honor Fellowships

Application for these programs should be made by March 1. The applicant should submit a letter specifically applying for one of the above programs to the Financial Aid Office. The letter should contain biographical data, information concerning experience in practice or teaching, and any other information that will be of assistance in the consideration of the application

Students applying for financial aid on the basis of financial need should follow the same guidelines outlined for Juris Doctor candidates.

Federal Work-Study Program

A limited amount of aid is available to students obtaining jobs through the Federal Work–Study Program. Applicants must have exhausted all federal sources of aid before eligibility for FWSP may be determined. The University's Office of Student Financial Assistance should be contacted for more information concerning work–study.

Veterans Benefits

The veterans counselor, located on the third floor of Rice Hall, 2121 I Street, N.W., assists students entitled to educational benefits as veterans or as widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. This office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or dependents of veterans should consult with the veterans counselor prior to submitting an application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and which includes other information of general interest.

Prizes and Awards

Anne Wells Branscomb Prize—Given to the member of the graduating class who attained the highest average grade in the entire course of the evening division for the degree of Juris Doctor.

Jacob Burns Prize—Given at graduation to the two members of the winning team in the Van Vleck Moot Court Competition. Established by Jacob Burns, LL.B. '24, LL.D. '70, formerly Trustee of the University.

Michael D. Cooley Memorial Award—Presented to that individual in the graduating Juris Doctor class who has been most successful in maintaining his or her compassion, vitality, and humanity during law school. The recipient of this award is selected by the graduating Juris Doctor class.

Ogden W. Fields Graduate Prize—Given to the member of the graduating Juris Doctor class who has demonstrated the highest overall proficiency in labor law.

Finnegan Prize in Intellectual Property Law—Given to a Juris Doctor or Master of Laws student for the best publishable article on an aspect of intellectual property law. Established by the law firm Finnegan, Henderson, Farabow, Garrett & Dunner.

Willard Waddington Gatchell Prize—Given to the three members of the graduating class who attained the highest average grade in the entire course for the degree of Juris Doctor. Established by bequest of Eona Burnett Gatchell in memory of her husband.

Charles Glover Prize—Given to the member of the graduating class who has attained the highest average grade in the third-year, full-time course for the Juris Doctor degree. Established by Charles Carroll Glover, Jr., formerly Trustee of the University, in memory of his great-grandfather, an illustrious member of the District of Columbia bar.

Judge Albert H. Grenadier Prize—Given to the members of the graduating Juris Doctor class who have represented the Law School at the Mid-Atlantic Regional Jessup Moot Court Competition.

Kappa Beta Pi Prize—Given by the Eta Alumnae Chapter to the member of the graduating class who attained the highest average grade in the first-year course of study for the Juris Doctor degree.

John Bell Larner Prize—Given to the member of the graduating class who attained the highest average grade in the entire course for the Juris Doctor degree.

Richard C. Lewis, Jr., Memorial Award—Presented to a member of the graduating Juris Doctor class who has exhibited extraordinary dedication to his or her work in the Jacob Burns Community Legal Clinics and unusual compassion and humanity toward clients and colleagues.

Justice Thurgood Marshall Prize—Given in honor of the late Supreme Court Associate Justice to a member of the graduating Juris Doctor class who has demonstrated outstanding performance in and dedication to the field of civil rights and civil liberties.

John Ordronaux Prizes—Given to the member of the graduating Juris Doctor class who attained the highest average grade in the first-year, full-time course of study and to the member of the graduating Juris Doctor class who attained the highest average grade in the second-year, full-time course of study.

Laurence E. Seibel Memorial Prize in Labor and Employment Law—Given to a member of the graduating Juris Doctor class who has demonstrated excellence in the courses in labor and employment law.

J.B. and Maurice C. Shapiro Public Services Prizes—Given to two members of the graduating Juris Doctor class who have shown particular dedication to public service during their student careers.

J.B. and Maurice C. Shapiro Environmental Law Prizes—Given to two members of the graduating Juris Doctor class who have achieved distinguished records related to the field of environmental law.

Richard L. Teberg, J.D. 1964, Prize—Given to the member of the graduating Juris Doctor class who has demonstrated the highest overall proficiency in the courses in securities law.

Jennie Hassler Walburn Prize—Given to members of the graduating Juris Doctor class for outstanding performance in the field of civil procedure. Established by bequest of Professor Orville Hassler Walburn in memory of his mother.

Imogen Williford Constitutional Law Prize—Given at graduation to an outstanding Juris Doctor student in the field of constitutional law. Established by Imogen Williford, J.D. '29.

General Information

Day and Evening Classes

Most day classes are scheduled between 9:00 a.m. and 5:50 p.m., Monday through Friday. The majority of evening classes meet from 6:00 to 7:50 p.m., Monday through Friday.

A 4-credit course, e.g., *Evidence*, meets two evenings a week; most 3-credit courses, e.g., *Administrative Law*, meet one evening a week plus alternate Friday evenings throughout the semester; a 2-credit course, e.g., *Contracts II*, meets one evening a week. The evening division conforms to the academic standards of the day division, with full-time faculty teaching all courses in the required and core curriculum.

Examinations for both day and evening classes may be given in the afternoon. Examinations for day students may be given in the evening.

Summer Session

One session is offered on campus in the summer. No beginning students are admitted to the Juris Doctor degree program in the summer session. Students who attend the summer session receive fractional residence credit.

Oxford-GW Summer Program in International Human Rights Law

The Program in International Human Rights Law is offered jointly by the University of Oxford and The George Washington University Law School and is held in Oxford in July. It is intended to prepare students to contribute to the improvement of human rights conditions in their homelands and around the world. During the program's four-week session, an internationally recognized faculty offers courses on the philosophy, history, doctrine, and practice of international human rights law. The program emphasizes advocacy and dissemination skills, as well as formal knowledge of human rights law, the means of its enforcement, and its status in a contentious world. Professor Ralph G. Steinhardt of the Law School faculty is co-director of the program. Applications are accepted from law students, graduate students in related fields, lawyers, and other professionals with a demonstrated interest in human rights. For more information, contact Summer Special and International Programs, The George Washington University, Washington, D.C. 20052; telephone (202)994-6360; fax (202)994-9133.

Registration

Each student must register before attending classes. No student will be registered until proper credentials have been filed (see Admission).

No registration is accepted for less than a semester or summer session. A student may not register concurrently in George Washington University and another institution. Registration in more than one school of the University requires the written permission of the deans concerned, prior to registration.

Eligibility for Registration

A student who is suspended or whose record is not clear for any reason is not eligible to register.

New Student—Upon receipt of a final letter of admission a new student is eligible for registration on the stated days of registration.

Readmitted Student—A student previously registered who was not registered for courses during the preceding semester or summer session and who has not been granted a leave of absence must apply for and receive a letter of readmission before becoming eligible for registration.

Graduation Requirements

Degrees are conferred in January, May, and August.

To be recommended by the faculty for graduation, a student must have met the admission requirements of the Law School, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which the student is registered, and be free from all indebtedness to the University. Registration is required for the semester or summer session at the close of which the degree is to be conferred.

Application for Graduation—An application for graduation must be filed by the date indicated in the Academic Calendar during the last semester or summer session of the final year. Students completing degree requirements during the summer session and fall semester will be awarded diplomas (no formal convocation) on August 31 and January 30, respectively, provided they have completed all degree requirements and have applied for graduation as part of registration. If they wish, such students may participate in the May Commencement.

Transcripts of Record

Official transcripts of student records will be issued by the Office of the Registrar on request of the student or former student who has a clear financial record. A fee of $5 is charged for each transcript.

Policy on Academic Integrity

The Law School seeks to foster academic excellence in the study of law and to prepare students for participation in the legal profession. Academic excellence, in any discipline, depends on an environment of honesty, integrity, and fairness. This general requirement is heightened by the special mission of a law school—to prepare students for a practice that relies heavily on the honor of its participants. The Law School community expects its members to uphold the highest ethical standards. It expects students to prepare for the duties of honesty and integrity that they will undertake as lawyers by practicing honesty and integrity throughout their time as students.

The responsibility for creating and maintaining academic integrity in the Law School community is shared by all members of the community—students, faculty, staff, and deans. *The George Washington University Law School Policy on Academic Integrity* defines and prohibits academic dishonesty. It prescribes procedures to be followed in cases of academic dishonesty. It also exhorts all members of the Law School community to foster a culture of honesty, integrity, and professional responsibility throughout the community.

The Law School's administrators shall make this policy available to all students and faculty members. It is the responsibility of all students to read and familiar-

ize themselves with this policy and also the University's *Guide to Student Rights and Responsibilities*, which is available from the dean of students' office. If, in light of the Law School community's norm of academic integrity, the propriety of certain conduct is in doubt, students must seek the advice of Law School faculty or administrators. Members of the Law School community are presumed to be familiar with the Policy on Academic Integrity and are responsible for conforming to its requirements.

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Student Activities and Student Life

Enrichment Program

The Law School supplements and enriches its diverse programs by bringing to the school eminent legal scholars, judges, distinguished members of the bar, members of Congress, and high-level government officials to offer lectures and informal seminars with students and faculty. Participants in the Enrichment Program have included columnist Anthony Lewis, Supreme Court Justices Lewis Powell, Antonin Scalia, Sandra Day O'Connor, Anthony Kennedy, Harry Blackmun, and Ruth Bader Ginsburg, Senator Bill Bradley, Judge Richard Posner of the U.S. Court of Appeals for the Seventh Circuit, author Scott Turow, attorney Alan Dershowitz, and Professor Ronald Dworkin of Oxford University. The Enrichment Program, funded largely by gifts from alumni and friends of the Law School, includes four endowed lectureships and a visiting scholar program. The endowed lectureships are the Manuel F. Cohen Memorial Lecture, the J.B. and Maurice C. Shapiro Lectures, the Susan N. and Augustus diZerega, Jr., Lecture, and the Shulman Foundation Lecture.

Publications

The George Washington Law Review, published six times a year, is edited and managed by the students of the Law School. The *Law Review* is known for its emphasis on federal and public law; however, it is also devoted to research in other important legal areas. The staff of the *Law Review* is selected on the basis of grades and a writing competition. The editorial board is selected from those students who have successfully completed the first year of *Law Review* work.

The George Washington Journal of International Law and Economics is managed and edited by law students. It presents articles and commentaries on public and private international financial development, comparative law, and international law. The staff of the *Journal* is selected on the basis of criteria identical to those used by the *Law Review*.

The Environmental Lawyer was founded as a joint venture between the Law School and the American Bar Association's Section on Natural Resources, Energy and Environmental Law. Edited and managed by students, the selection criteria for staff are the same as those used by the *Law Review*. *The Environmental Lawyer* is published three times a year; one issue is devoted to a symposium on a selected topic in environmental law.

The Public Contract Law Journal is produced jointly by the Law School and the Public Contract Law Section of the American Bar Association. The journal is published quarterly and is edited and managed by J.D. and LL.M. students. The selection criteria for J.D. staff members is the same as those used by the *Law*

Review. LL.M. students submit a resume, writing sample, and personal statement to be considered for membership.

The American Intellectual Property Law Association Quarterly Journal, a publication of the AIPLA, is edited and managed by law students under the direction of the editor-in-chief, Professor Joan Schaffner. J.D. student staff members are selected on the basis of a national writing competition.

Skills Boards

Lawyering skills competitions and programs provide realistic training in client counseling, negotiation, trial advocacy, and appellate advocacy. The Law School's student-managed Alternative Dispute Resolution (ADR) Board, Trial Court Board, and Moot Court Board are dedicated to the promotion and development of these skills among the student body. The ADR Board administers client counseling and negotiation programs at the Law School and also sponsors lectures by practitioners on emerging dispute resolution techniques. The Trial Court Board sponsors civil and criminal intrascholastic trial competitions and sends student teams to interscholastic trial competitions nationwide. The Moot Court Board administers intrascholastic, apellate-level competitions in the areas of constitutional law, international law, government contracts law, and intellectual property law. The Moot Court Board also selects and sponsors students to represent the school at interscholastic competitions across the nation and sponsors an invitational interscholastic competition, the National Security Law Moot Court Competition.

Law Student Organizations

Amnesty International Legal Support Group
Asian–Pacific American Law Student Association
Black Law Student Association
Christian Law Association
Entertainment and Sports Law Society
Environmental Law Association
Equal Justice Foundation
Evening Law Student Association
Federalist Society
GW Law Democrats
GW Republican Student Lawyers Association
Hispanic Law Student Association
International Law Society
International Legal Studies Student Association
Jewish Law Student Association
Law Association for Women
Lambda Law
Law Fraternities and Sororities
Law Students for the Arts
Nota Bene
South Asian Law Student Association
Street Law
Student Bar Association
Student Health Law Association
Student Intellectual Property Law Association
Student Trial Lawyers Association

Facilities and Services

The Law School

The Law School consists of seven buildings. Three of the buildings—Theodore N. Lerner Hall, Stockton Hall, and the Jacob Burns Law Library—adjoin one another, have internal passageways on most floors, and largely function as one consolidated complex. Lerner Hall is a modern and innovative teaching facility. Its five levels contain classrooms, the dean's suite, and the Moot Court Room. Four of its eight classrooms are constructed in amphitheater style and are equipped with advanced sound systems and full video and viewing capabilities. Stockton Hall contains administrative offices, classrooms, faculty offices, reading rooms, a media center, and student lounges. The Jacob Burns Law Library houses faculty and student organization offices, a rare book room, and seven levels of stacks and study areas.

Four additional buildings are all located within one block of the main Law School complex. One townhouse is home to the Community Legal Clinics and the Career Development Office. Two others house student publications. The fourth building contains various administrative offices, including admissions and financial aid.

The Jacob Burns Law Library

The Jacob Burns Law Library serves the students and faculty of the Law School by offering a wealth of legal and law-related information in a variety of formats. A collection strong in historical material has been merged with automated resources to meet the needs of researchers in many specialized areas. The Library itself, housed on six levels, offers a wide range of study areas, including several large, comfortable reading rooms, a number of small conference rooms and study cubicles, and a lounge containing a leisure reading collection, magazines, and telephones.

A staff of 30 librarians and support staff, several of whom are trained in both law and information science, is the key to using the collection of more than 400,000 volumes and volume equivalents. Emerging technology has been fully utilized with the development of a CD-ROM network that provides simultaneous access to a number of indexing and full-text databases by multiple users. The Library's sophisticated online catalog, JACOB, can be used both to locate materials within the facility and to access the online catalogs of neighboring institutions, including the Library of Congress. Two new computer classrooms within the Library have been developed to provide expanded access to automated resources. One of these computer classrooms is dedicated to the two leading computer-assisted legal research databases, LEXIS/NEXIS and WESTLAW, while the other serves a variety of word processing and research purposes.

The collection itself, while broad-based, focuses on Anglo-American resources and is particularly strong in the areas of environmental law, intellectual property, government procurement and federal practice, tax law, and labor law. A large international and comparative law collection is available to meet the needs of the many researchers who come to the Law School to pursue work in those areas.

The Burns Law Library, a depository for the Government Publications Office since 1978, features a strong collection of federal documents. The Library also attempts to collect materials in a variety of related areas such as history, economics, and political science for individuals conducting interdisciplinary research. In addition, the excellent collections of the University's two other libraries, the Gelman Library and the Himmelfarb Health Sciences Library, are both within a few blocks of the Law School.

Career Development and Placement Services

The Career Development Office provides a full range of services to support the career decision-making process. Students, graduates, and prospective employers are served through a variety of programs, including systems of job-vacancy advertising; newsletters of current career information, interviewing programs; individual and group counseling on resume preparation, interviewing skills development, and job-search strategy; a career resource library; and forums and panel presentations covering legal and alternative career topics and employment options; and an alumni network.

Continuing Legal Education

Members of the Bar who wish to keep abreast of current developments in the law may register for any of the courses in the Law School on a noncredit basis as Continuing Legal Education students. Specific courses are also open to nonlawyers whose special qualifications justify their registration. Such students do not take examinations in courses and no grades are recorded for their work.

A simplified admission and registration procedure is used and must be completed on or before the last day of regular registration for the appropriate semester. Continuing Legal Education students pay only the tuition fee on the semester-hour basis. They may not participate in student activities or benefit from the medical privileges of the University. (Continuing Legal Education registrations are subject to cancellation if courses are filled by regularly registered students.)

Housing

The University does not provide regular residence hall space for graduate students. However, the Residential Life Office refers graduate students to apartments as they become available in University-owned buildings in the campus area. Additionally, the University's Off-Campus Housing Resource Center can provide information and assistance for those seeking accommodations.

Food Service

Contract food service is available from August to May, based on the undergraduate academic calendar of registration, exams, and vacation periods. Accommodations for the law school calendar are made. Rates for the various meal plans are available from the Residential Life Office. Students who observe the Jewish dietary laws can write to make arrangements with the Office of Residential Life regarding the B'nai B'rith Hillel Foundation Kosher Meal Plan.

The Cloyd Heck Marvin Center

The Cloyd Heck Marvin Center serves as the campus community center, providing services, conveniences, and recreational and social opportunities for students, faculty, staff, alumni, and guests. Its wide range of facilities provides the setting for a variety of programs conducted by the University Program Board, the departments offering course work in the performing arts, and other student and faculty organizations. The Center Governing Board, representing varied segments of the University community, plays an important role in the day-to-day functioning of the Center. This Board works closely with the full-time staff in the development of procedures and policies that provide a framework for the Center's operation.

The Charles E. Smith Center

The Charles E. Smith Center offers many facilities for student use, including courts for basketball, volleyball, and badminton; a jogging track; a swimming pool; gymnastics and weight rooms; racquetball and squash courts; and a sauna and lockers.

Student Health Service

The Student Health Service is an outpatient clinic located at 2150 Pennsylvania Avenue, N.W. (entrance on 22nd Street).

The Health Service is staffed by physicians, nurse practitioners, and physician assistants who are capable of addressing most of students' medical problems. Visits may be either arranged by appointment or, during certain hours, secured on a walk-in basis. Most routine laboratory tests may be performed in the Health Service lab at cost, many common medications are stocked to fill students' prescriptions, and allergy shots and immunizations are administered by the staff nurse for a minimal charge. A psychiatrist works in the Health Service to assist students with mental health concerns.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. This arrangement is for emergency care only and all fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and the Continuing Legal Education Program are not eligible. Students who so desire may engage physicians and nurses of their own choice, but these students will be responsible for all fees charged. The bills incurred from all services rendered outside the Student Health Service (for example, x-ray work, laboratory work, and referrals to specialists or other outside physicians) are the responsibility of the student.

Health and Accident Insurance

The University recommends that all students be covered by health and accident insurance. For information on group health insurance options offered through the University, students should contact the Student Health Service or Office of the Dean of Students.

Disability Support Services

The director of Disability Support Services coordinates advising, orientation, and special services that address the needs of disabled students. The director also serves as a central point of contact from which the University community may obtain information and assistance in serving disabled students. A resource library maintained in the office is available for general use.

University Regulations

University Policy on Equal Opportunity

The George Washington University does not unlawfully discriminate against any person on the basis of race, color, religion, sex, national origin, age, disability, veteran status, or sexual orientation. This policy covers all programs, services, policies, and procedures of the University, including admission to educational programs and employment. The University is also subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Associate Vice President for Human Resources, The George Washington University, Washington, D.C. 20052, (202)994-4433, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

University Policy on the Release of Student Information

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must:

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive the student's written consent before releasing information from his or her education records to persons outside the University, except for directory information as indicated below. Information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency; and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of emergency contact; dates of attendance; school or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height and weight of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information is published in the *Guide to Student Rights and Responsibilities*, available in the Office of the Dean of Students.

Right to Change Rules

The University and its schools and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

Right to Dismiss Students

If a student knowingly makes a false statement or conceals material information on an application for admission, registration form, or any other University docu-

ment, the student's registration may be canceled and the student will be ineligible (except by special action of the faculty) for subsequent registration.

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes whenever, in the interest of the student or the University, the University Administration deems it advisable.

Right to Make Changes in Programs

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

Property Responsibility

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the University Police Office.

Student Conduct

All students upon enrolling and while attending The George Washington University are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained at the Office of Judicial Affairs. Sanctions for violation of these regulations may include permanent expulsion from the University, which may make enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

University Policy on Drugs

The University cannot condone violations of the law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

Courses of Instruction

Planning a Balanced Program

After the completion of the required curriculum, J.D. students have a vast domain of courses to choose from in their remaining years of study at the Law School. The fact that a large number of courses are offered does not mean that all courses have the same importance. Rather, the large curriculum is intended to offer students substantial freedom to tailor their programs to their own interests and future needs.

The faculty recommends that all students take programs that give them a strong foundation in the standard subject areas of the law. Some students choose to pursue a particular area of the law in special depth or breadth because of particular career inclinations or for the intellectual values associated with specialized study. The faculty, however, warns students against excessive specialization. It is impossible to foresee with precision future career changes and challenges, and lawyers are not expected by the bar to be specialists when they graduate from law school. The freedom in course selection permitted by the elective policy at the Law School places the responsibility for planning a coherent academic program on the individual student. Students are strongly encouraged to consult with members of the faculty or the administration for guidance on their programs.

Consistent with its commitment to a balanced program, the Law School offers multiple sections of important elective courses every academic year. These multiple-section courses survey the most important subjects in the law and include *Administrative Law* (400), *Antitrust Law* (402), *Commercial Paper–Payment Systems* (282), *Conflict of Laws* (234), *Constitutional Law II* (380), *Corporations* (250), *Creditors' Rights and Debtors' Protection* (284), *Criminal Procedure* (360), *Environmental Law* (430), *Evidence* (230), *Family Law* (348), *Federal Courts* (232), *Federal Income Taxation* (300), *International Law* (520), *International Business Transactions* (522), *Secured Transactions* (280), *Securities Regulation* (252), and *Trusts and Estates I* (342). The faculty recommends that J.D. students take a large number of these courses as part of their individual program. Some are prerequisites for certain specialized courses, clinics, or simulation courses and so should be taken early in a student's course of elective study.

The law faculty also believes that it is important that students understand the relationship between law and other disciplines. History, philosophy, economics, medicine, the social sciences, the humanities, and other fields offer perspectives on the law and the development of legal institutions. Accordingly, the faculty recommends that students take one or more interdisciplinary courses. They include *Feminist Legal Theory* (608), *History of the U.S. Constitution* (594), *Jurisprudence* (590), *Jurisprudence Seminar* (592), *Law and Literature* (606), *Law and Medicine* (617), *Law and Psychiatry* (614), *Law and Psychology* (615), *Law and Accounting* (602), *Law and Economics* (598), *Law and Social and Economic History* (596), *Public Economic Policy and the Law* (600), *Quantitative Analysis for Lawyers* (604), *Race, Racism, and American Law* (595), *Sexuality and the Law* (394), and *Survey of U.S. Legal History* (591).

The curriculum offers a large variety of clinical courses, simulation courses, and outside placement options in which students have the opportunity to learn lawyering and other advocacy skills in several contexts. These courses permit students to complement the theoretical study of law with experience in interviewing clients, investigating facts, dealing with adverse parties, contacting government agencies, negotiating on behalf of clients and participating in real or hypothetical court and administrative proceedings. The faculty recommends that students take one or more such courses. These courses include *Administrative Advocacy Clinic* (632), *Advanced Oral Advocacy* (652), *Alternative Dispute Resolution* (647), *Civil Litigation Clinic* (624), *Client Interviewing and Counseling* (650), *Consumer Mediation Clinic* (620), *Domestic Violence Clinic* (628), *Environmental Law Clinic* (627), *Environmental Crimes Project* (465), *Federal Trial Practice* (642), *Federal Criminal*

and Appellate Clinic (625), *Health Law Rights Clinic* (631), *Immigration Clinic* (630), *Intensive Clinical Placement* (638), *Law Students in Court* (634), *Mediation* (646), *Moot Court* (644), *Alternative Dispute Resolution* (647), *Negotiations* (648), *Outside Placement* (633), *Pre-Trial Advocacy* (643), *Prisoners Project* (376), *Small Business Clinic* (621), *Trial Advocacy* (640), *Trial Court Competition* (654), and *Vaccine Injury Clinic* (626).

Career Planning and Course Selection

Every spring a series of counseling sessions is held to provide students with an overview of course offerings in various areas of the law and to assist them in selecting courses and defining their career objectives. Students may also consult members of the faculty for course and career planning. In addition, the Career Development Office provides a central storehouse of information regarding many types of legal careers.

To assist students in choosing upper-class courses and planning graduate programs of study, the Law School's courses are listed below according to principal practice areas, with a brief introduction to the gateway courses in each area. Each listing begins with those basic courses in the practice area that are typically offered in multiple sections, moves next to advanced courses typically offered just once each year, and continues with seminars and clinics related to the practice area. Some courses are listed in several practice areas.

Many courses listed in the course description section of this Bulletin under the headings Law and Other Disciplines (Law 590–617) and Skills and Simulations Courses (Law 640–667) are not repeated in the practice areas listed below. This is because they concern perspectives on the law or lawyering skills that are applicable to all of these practice areas. Students should, therefore, consider taking courses from these categories to complement courses taken within specific practice areas.

Students should consult course descriptions to determine the prerequisites and eligibility criteria.

Practice Areas

Courses with an asterisk are not offered this academic year.

Administrative Law and Government Regulation

This large and important field deals with the process by which government regulates the activities of businesses or individuals. *Administrative Law* is the foundation course for all study in this area. Other key survey courses include *Antitrust Law*, *Unfair Trade Practices*, and *Legislation*. Advanced courses explore the administrative process in the context of a single commercial activity such as health care or the telecommunications industry. Almost all of the courses included in the closely related practice areas of environmental law, government contract law, intellectual property law, labor law, and taxation, which are set out separately in this practice area listing, could fairly be termed species of administrative law and government regulation.

Foundation Courses
Administrative Law (400)
Antitrust Law (402)
Unfair Trade Practices (404)
Legislation (416)

Advanced Courses
Regulated Industries (406)*
Food and Drug Law (408)
Health Care Law (410)
Print Media Law (412)
Broadcast and Cable Regulation (413)
Telecommunications Law (414)
Legislative Analysis and Drafting (418)
Local Government Law (422)
Energy Law (438)
Law in Cyberspace (485)*
Health Care Law Seminar (411)

Government Lawyering Seminar (420)*
Public Law Seminar (426)*
Administrative Advocacy Clinic (632)

Alternative Dispute Resolution

The courses in this area explore the rapidly growing field of dispute resolution outside the courtroom. Lawyers have always resolved most of their clients' disputes without trial, by negotiation and settlement. These courses formally train students in these and related dispute-resolution techniques. *Negotiations*, *Alternative Dispute Resolution*, and *Mediation* are the foundation for all courses in this area. The remaining courses apply techniques learned in the foundation courses in different contexts.

Foundation Courses
Mediation (646)
Alternative Dispute Resolution (647)
Negotiations (648)

Advanced Courses
Environmental Negotations (458)
International Arbitration (556)
International Negotiations (558)
Client Interviewing and Counseling (650)
Consumer Mediation Clinic (620)
Health Insurance Counseling Clinic (631)

The following courses are open only to LL.M. degree candidates
Mediation and Alternative Dispute Resolution (676)
Ethics in Adjudication and Settlement (678)
Negotiation and Conflict Management Systems Design (681)
International Dispute Resolution (682)

Advanced Torts

Personal injury and property damage claims are a major part of modern civil litigation. The courses in this practice area all build upon the basic first-year *Torts* course and complete the study of non-contractual private liabilities. *Insurance* deals in part with the process of shifting the risks associated with such liabilities.

Advanced Courses
Complex Litigation (236)
Remedies (238)
Admiralty (293)
Insurance (298)
Products Liability (354)
Toxic Tort Litigation (449)
Law and Medicine (617)
Advanced Torts Seminar (358)*
Civil Litigation Clinic (624)
Vaccine Injury Clinic (626)
Domestic Violence Clinic (628)

Commercial Law

Commercial law regulates the operation of the marketplace, including transactions between businesses and between a consumer and a business. Three courses focus on various portions of the Uniform Commercial Code: *Secured Transactions* (Articles 2A and 9), *Commercial Paper–Payment Systems* (primarily Articles 3, 4, and 4A), and *Creditors' Rights and Debtors' Protection* (state law debt collection and bankruptcy). Advanced courses focus on consumer transactions, the banking industry, and international commercial transactions.

Foundation Courses
Secured Transactions (280)
Commercial Paper–Payment Systems (282)
Creditors' Rights and Debtors' Protection (284)
Banking Law I (290)

Advanced Courses
Consumer Protection Law (286)*
Banking Law II (291)*
Admiralty (293)
Sports Law (295)
Entertainment Law (297)*
Insurance (298)

International Business Transactions (522)
International Commercial Law (524)*
International Banking (542)
Banking Law Seminar (292)
Commercial Law Seminar (288)
International Business Transactions Seminar (564)
Consumer Mediation Clinic (620)

Constitutional Law and Civil Rights

This major field deals with the proper role of various branches of government and the protection of individual rights and liberties. Building upon the required course on federal powers, *Constitutional Law I*, the courses in this practice area explore the constitutional structure of our federal government and its relationship to the states. A related set of courses addresses the protection of individual civil rights.

Foundation Courses
Federal Courts (232)
Conflict of Laws (234)
Constitutional Law II (380)
Legislation (416)

Advanced Courses
Family, Child, and State (349)
The Civil War Amendments: 13th, 14th, and 15th (381)*
The First Amendment (382)
Law of Separation of Powers (384)*
Foreign Relations and National Security Law (386)
Civil Rights Legislation (388)
Civil Rights and Civil Liberties in Education (389)*
Employment Discrimination Law (390)
Gender Discrimination and the Law (392)
Sexuality and the Law (394)
Federal Indian Law (397)
Law of Privacy (398)
Print Media Law (412)
Broadcast and Cable Regulation (413)
Law in Cyberspace (485)*
Immigration Law (538)
History of the U.S. Constitution (594)*
Disabled People and the Law (635)
Constitutional Law and the Supreme Court (395)
Constitutional Law Seminar (399)
Immigration Clinic (630)
Legal Activism (637)
Law and the Deaf (636)

Corporate Law and Securities Regulation

This practice area concentrates on the legal rules governing the formation, organization, financing, and operation of most modern businesses. *Corporations* is both a basic course and a prerequisite to many of the advanced courses in this field. *Securities Regulation* and *Corporate Finance* are other key courses. *Business Planning* offers an opportunity to study corporate, securities, and tax law in a single offering.

Foundation Courses
Corporations (250)
Securities Regulation (252)

Advanced Courses
Corporate Finance (254)*
Takeovers and Tender Offers (256)*
Regulation of Securities Markets and Professionals (258)*
Regulation of Investment Companies and Advisers (260)
Agency and Partnership (294)
Business Planning (296)
Corporate Taxation (302)
Partnership Taxation (304)
Nonprofit Organizations: Law and Taxation (314)
Law and Accounting (602)*
Corporation Law Seminar (262)
Securities Law Seminar (264)*
Small Business Clinic (621)

Criminal Law and Procedure

Building upon the required course on substantive criminal law, the courses in this practice area explore the rules governing criminal procedure, the sociology of crime, and the application of the criminal law to particular conduct, such as envi-

ronmental crimes and the use of drugs. The survey course, *Criminal Procedure*, is the starting point for study in this area.

Foundation Course
Criminal Procedure (360)

Advanced Courses
Comparative Military Law (244)
Adjudicatory Criminal Procedure (362)
White Collar Crime (364)
Law and Criminology (366)
Law of Criminal Corrections (368)*
Forensic Science (370)
Drugs and the Law (372)
Environmental Crimes (464)
International Criminal Law (554)
Federal Sentencing Seminar (374)
Criminal Law and Procedure Seminar (379)*
Prisoners Project (376)
Environmental Crimes Project (465)
Law Students in Court (634)

Environmental Law

The basic course in environmental law surveys in general terms the wide variety of federal statutes regulating activity affecting the environment. More than a dozen specialized courses focus on particular federal laws regulating particular resources or industries.

Foundation Course
Environmental Law (430)

Advanced Courses
Natural Resource Taxation (310)*
Land Development Law (336)
Regulated Industries (406)*
Air Pollution Control (432)
Environmental Law Enforcement (433)*
Water Pollution Control (434)
International Trade and Environmental Law (435)
Water Resources Law (436)
Coastal, Navigation, and Wetlands Resource Law (437)
Energy Law (438)
Natural Resources Law (440)
Regulation and Management of Ecosystems (441)*
Control of Solid and Hazardous Wastes (RCRA & CERCLA) (442)
Regulation of Pesticides and Industrial Chemicals (FIFRA & TSCA) (444)
Nuclear Energy Law (446)*
Toxic Tort Litigation (449)
Federal Facilities Environmental Law Issues (450)
Environmental Issues in Business Transactions (452)
International Environmental Law (454)
Environmental Planning (456)*
Environmental Negotiations (458)
Environmental Compliance and Enforcement Mechanisms (463)
Environmental Crimes (464)
Environmental Law Seminar (466)
Government Contracts and Environmental Law Seminar (507)
Environmental Crimes Project (465)
Environmental Legislation Project (467)
Graduate Environmental Placement (468)
Environmental Law Clinic (627)

Family Law and Estate Planning

This cluster of courses investigates the role of the law in family matters and the inheritance of wealth.

Foundation Courses
Trusts and Estates I (342)
Family Law (348)
Family, Child, and State (349)

Advanced Courses
Estate and Gift Taxation (306)
Trusts and Estates II (343)*
Legal Problems of the Elderly (353)
Gender Discrimination and the Law (392)
Sexuality and the Law (394)
Feminist Legal Theory (608)
Estate Planning Seminar (346)
Family Law Seminar (352)
Domestic Violence Clinic (628)
Civil Litigation Clinic (624)

Government Contract Law

The courses in this practice area explore the unique body of rules regulating the process by which the federal government enters into contracts with private parties and oversees the performance of those contracts. *Government Contracts* is a survey course for those seeking a general overview of the law in this area. Students preferring a longer course of study may choose instead to take the *Formation of Government Contracts* and *Performance of Government Contracts* sequence.

Foundation Course
Government Contracts (500)

Advanced Courses
Formation of Government Contracts (502)
Performance of Government Contracts (503)
Government Contracts Cost and Pricing (506)
Government Contracts and Environmental Law Seminar (507)
Comparative Public Procurement (508)*
Government Contracts Seminar (509)
Graduate Government Contracts Placement (510)

Intellectual Property

This growing practice area concerns the development and protection of intangible ideas and property. The principal survey courses are *Unfair Trade Practices*, *Trademark Law*, *Copyright Law*, and *Patent Law*. A related course is *Antitrust Law*.

Foundation Courses
Patent Law (470)
Copyright Law (472)
Trademark Law (474)
Antitrust Law (402)
Unfair Trade Practices (404)

Advanced Courses
Patent Policy and Practice (476)*
Licensing of Intellectual Property Rights (478)
Chemical and Biotech Patent Law (480)*
Patent Enforcement (482)
Computer Law (484)
Law in Cyberspace (485)*
Biotechnology Patent Policy (486)*
Japanese Patent Policy (488)*
International and Comparative Patent Law (490)
Intellectual Property Antitrust Seminar (494)
Intellectual Property Law Seminar (496)
Intellectual Property Issues Short Seminar (498)*
Law, Science, and Technology Seminar (462)*

International Law

These courses explore the international and domestic laws that regulate or influence international activity among countries, international institutions, businesses, and individuals. The two key survey courses are *International Law* and *International Business Transactions*. The remaining advanced courses focus on a wide range of issues in both public and private international law as well as the domestic law of other countries.

Foundation Courses
International Law (520)
International Business Transactions (522)

Advanced Courses
International Taxation I (312)
International Taxation II (313)
International Commercial Law (524)*
International Trade Law (526)
Advanced International Trade Law (527)*
International Litigation (528)
International Organizations (530)
Comparative Law (532)
Law of the European Union (534)

Law of Japan (536)
Traditional Jewish Civil Law (537)
Immigration Law I (538)
Immigration Law II (539)
Refugee and Asylum Law (540)
International Banking (542)
Foreign Direct Investment (544)
International Law of Human Rights (546)
Air and Space Law (548)
Law of the Sea (550)
International Law of Territory (551)
Law of War (552)
International Law, Ethics, and Conflict (553)*
International Criminal Law (554)
International Arbitration (556)
International Negotiations (558)
Human Rights Lawyering (568)*
Conflict of Laws (234)
Admiralty (293)
Taxation of International Transactions (312)
Law of Separation of Powers (384)*
Foreign Relations and National Security Law (386)
International Trade and Environmental Law (435)
International Environmental Law (454)
Comparative Public Procurement (508)*
Public International Law Seminar (562)
International Business Transactions Seminar (564)
Comparative Law Seminar (565)*
Immigration Clinic (630)

Labor and Employment Law

This field of law deals with all aspects of the employment relationship. The key survey courses are *Labor Law*, which covers the organization and representation of employees through unions, and *Individual Employment Rights*, which explores the rights of unrepresented workers. Advanced courses focus on a variety of other legal rules that apply in the workplace or affect the employer-employee relationship.

Foundation Courses
Labor Law (266)
Individual Employment Rights (268)

Advanced Courses
Employee Benefit Plans (272)
Labor Standards (274)*
Agency and Partnership (294)
Sports Law (295)
Employment Discrimination Law (390)
Gender Discrimination and the Law (392)
Labor and Employment Law Seminar (276)*

Litigation and the Judicial Process

Courses in this area examine the procedural and remedial rules that regulate civil and criminal litigation in our state and federal courts. Building upon the required *Civil Procedure I* and *II* sequence, the key survey courses in this area are *Criminal Procedure*, *Evidence*, *Federal Courts*, *Conflict of Laws*, and *Remedies*. Related simulation courses include *Trial Advocacy*, *Federal Trial Practice*, and *Moot Court*, among others.

Foundation Courses
Evidence (230)
Federal Courts (232)
Conflict of Laws (234)
Remedies (238)
Criminal Procedure (360)

Advanced Courses
Complex Litigation (236)
Equity (240)*
Comparative Military Law (244)
Appellate Practice (246)
Admiralty (293)
Insurance (298)
Products Liability (354)
Adjudicatory Criminal Procedure (362)
Toxic Tort Litigation (449)
Pre-Trial Advocacy (643)
Advanced Oral Advocacy (652)*
Civil Procedure Seminar (249)*
Federal Sentencing Seminar (374)
Government Lawyering Seminar (420)*

Professional Responsibility and Ethics Seminar (593)*
Civil Litigation Clinic (624)
Federal, Criminal, and Appellate Clinic (625)
Vaccine Injury Clinic (626)
Domestic Violence Clinic (628)
Law Students in Court (634)

The following courses are open only to LL.M. degree candidates
Advanced Trial Advocacy (675)
Pre-Trial Practice in Civil Cases (677)
Ethics in Adjudication and Settlement (678)
Advanced Evidence (679)
The American Jury (680)
College of Trial Advocacy (683)

Property and Land Development

Building upon the required course *Property*, this practice area concerns the process of developing real estate for residential and commercial use. The key survey course is *Modern Real Estate Transactions*, with subsequent courses addressing the administrative, governmental, and tax issues attending the real estate industry.

Foundation Courses
Modern Real Estate Transactions (330)
Land Use Law (332)

Advanced Courses
Law of Real Estate Financing (334)
Land Development Law (336)
Housing Rights Law (338)
Real Estate and Income Taxation (308)*
Natural Resources Taxation (310)*
Partnership Taxation (304)
Agency and Partnership (294)
Property and Real Estate Seminar (340)

Taxation

Federal Income Taxation examines the fundamental rules controlling the taxation of individuals and serves as the gateway course to all of the other subjects in this practice area. The remaining courses explore the taxation of other entities, such as corporations and partnerships, the taxation of wealth transfers, and the tax rules applicable to particular transactions or industries.

Foundation Courses
Federal Income Taxation (300)
Corporate Taxation (302)

Advanced Courses
Partnership Taxation (304)
Estate and Gift Taxation (306)
Pension Law and Taxation (307)
Real Estate and Income Taxation (308)*
Natural Resources Taxation (310)*
International Taxation I (312)
International Taxation II (313)
Nonprofit Organizations: Law and Taxation (314)
State and Local Taxation (316)
Business Planning (296)
Employee Benefit Plans (272)
Quantitative Analysis for Lawyers (604)*
Law and Accounting (602)*
Tax Policy Seminar (318)

Course Descriptions

The courses of instruction are described below. The number of hours of credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, an academic-year course with two hours of credit each semester is marked (2–2) and a semester course with two hours of credit is marked (2). Some courses are offered for variable credit hours and are marked (2 or 3) or (3 or 4). Each semester's class schedule will indicate the number of hours for which the course is being offered.

The method by which students will be evaluated in the course is indicated at the end of each course description. See *Method of Evaluation* under Academic Evaluation, Juris Doctor Degree and Master of Laws Degree.

A designation at the end of a course description indicates whether the course is scheduled to be offered in the spring or fall semester or summer session of the current academic year and also usually whether it will meet in the day or evening. These designations are designed to serve as a guide to assist students in course scheduling and do not constitute a guarantee that courses will be offered or scheduled at the same time in subsequent academic years. When a double-numbered course is designated "Academic year," the first half of the course is scheduled to be offered in the fall, the second half in the spring.

Required Courses for J.D. Students

202–3 Contracts I–II (3–3 day) (4–2 evening) Maggs, Wilmarth, Hamburger, Thomas, Bratton, Kovacic, Van Alstine

Legal remedies of contracting parties, including damages in contract and quasi-contract, specific performance, reformation, rescission, remedies in tort; acts creating and terminating contractual rights, including offer and acceptance, mistake, problems of proof; function of consideration; conditions; assignments; third-party beneficiaries; effect of changed circumstances; protection of the client's interests upon breach or threat of breach by the other party. Emphasis on problems of analysis, draftsmanship, adversary method. (Examination) (Academic year—day and evening)

206 Torts (4) Schechter, Park, Turley, Banzhaf, Pierce

Liability for harm to person or property. Intentional torts, negligence, nuisance, products liability, defamation, and invasion of privacy; fault and other bases for shifting losses; causation, damages, effects of liability insurance, problems under Federal Tort Claims Act. (Examination) (Fall—day and evening)

208 Property (4) Schwartz, Johnston, Brauneis, Tuttle, Steinhardt

Basic concepts of personal property. Real property: historical background of the law of estates and conveyancing, types of estates, dower and curtesy, landlord and tenant relationship, concurrent estates, future interest at common law and after the Statute of Uses; introduction to modern conveyancing—the real estate contract, the deed, the recording system, methods of title assurance. (Examination) (Fall—evening; spring—day)

210 Criminal Law (3) Robinson, Butler, Sirulnik, Cottrol, Strong

An overview of the criminal justice system; dimensions of the problem of crime and goals of penal sanctions. An examination of what conduct should be made criminal and what sanctions should be applied. The theoretical anatomy of a criminal offense (elements of *mens rea* and *actus reus*), the general principles of criminal liability, and the various defenses. Special problems, such as conspiracy, inchoate crimes, causation, insanity, and complicity, are subjected to detailed analysis. (Examination) (Fall—day; spring—evening)

212–13 Civil Procedure I–II (3–3) Friedenthal, Raven-Hansen, Carter, Schaffner, Clark, Siegel, Molot

The theory and practice of civil litigation. Analysis of the goals, values, costs, and tensions of an evolving adversarial system of adjudication. Examination of the rules and statutes that govern the process by which substantive rights and duties are enforced in our federal and state courts. Topics include the relationship of procedure to substantive law, the proper reach of judicial authority, pleading, motions practice, joinder of parties and claims, class actions, pretrial discovery, trial by jury, remedies, post-trial procedure, appeals, claim and issue preclusion, and alternative dispute resolution. (Examination) (Academic year—day and evening)

214 Constitutional Law I (Federal Systems) (3) Barron, Dienes, Maggs, Cheh, Clark

Basic principles of American constitutional law, with a focus on governmental powers and the role of the Supreme Court in interpreting and enforcing constitutional norms. The nature and scope of judicial review. The case and controversy requirement and other limitations on constitutional adjudication. Powers

of the president and Congress; the separation of powers doctrine. Relationship of the national government to state governments and principles of federalism. The state action doctrine. (Examination) (Spring—day and evening)

216 **Legal Research and Writing** (2) Sloan, Harrington-McBride, and Staff
Introduction to use of a law library, research experience in primary, secondary, and specialized sources of law; practice in proper legal citation form. Instruction and practice in legal writing and analysis, with primary emphasis on legal memoranda. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Failure to complete the work in this course will result in a grade of *F*. (Fall—day and evening)

217 **Introduction to Advocacy** (2) Sloan, Harrington-McBride, and Staff
Instruction and experience in the research and writing of pretrial motions and appellate briefs, with emphasis on preparing and presenting arguments persuasively. Also instruction and practice in preparing and presenting oral arguments. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Failure to complete the work for this course will result in a grade of *F*. (Spring—day and evening)

218 **Professional Responsibility and Ethics** (2 or 3) Jenkins, Johnston, Gabaldon, Tuttle, Strong
Ethical problems involved in civil and criminal counseling and litigation. Rules of Professional Conduct and legal discipline, roles of bar associations and courts in regulating lawyer conduct. (Examination) (Fall and spring—day and evening)

Courts and Civil Litigation

230 **Evidence** (4) Robinson, Saltzburg, Carter, Ross, Strong
Consideration of the policies, principles, standards, and rules governing the trial of civil and criminal cases in federal and state courts. Topics may include relevancy, the hearsay rule, direct and cross examination of witnesses, opinion, scientific evidence, impeachment, privileges, writings, real and demonstrative evidence, judicial notice, confrontation and compulsory process, and burdens of proof and presumptions. (Examination) (Fall—day and evening; spring—day)

232 **Federal Courts** (3) Clark, Lupu, Siegel
Analysis of the relationship of the federal courts to Congress and to the states. Topics may include judicial review, standing and justiciability, congressional power to regulate jurisdiction, legislative courts, federal question, diversity, removal, civil rights, and habeas corpus jurisdiction, state sovereign immunity, Supreme Court appellate jurisdiction, abstention, federalism doctrines, and federal common law. Clark—third-year status strongly recommended. (Examination; Clark—take-home examination) (Fall—day; spring—day and evening)

234 **Conflict of Laws** (3) Friedenthal, Lettow, Franklin
Legal problems arising from occurrences transcending state or national boundaries; jurisdiction; foreign judgments, constitutional influences; theoretical bases of choice of law principles and their application to specific fields, including torts, contracts, property, family law, administration of estates, business associations. (Examination) (Fall—day; spring—day and evening)

236 **Complex Litigation** (3) Trangsrud
Analysis and critique of complex civil litigation in the state and federal courts. Examination of complex joinder, the management of factually related claims in multiple venues, modern class-action practice, and current developments in the law of claim and issue preclusion. Other topics covered in some years include judicial supervision of plaintiff and defendant class actions; discovery and judicial control of large cases; the role of juries, magistrates, and masters in complex cases; and problems attending complex remedies such as the use of structural injunctions to reform public schools, hospitals, and prisons. (Examination) (Fall—day)

238 **Remedies** (3) Sharpe
The types and forms of relief that judges can award in civil litigation: decisional and statutory damages in contract, quasi contract, and tort, including tort reform and wrongful death, overcoming limitations of actions and releases; injunctions as provisional and final relief; equitable remedies, such as specific performance,

recission, and reformation; relief from fiduciaries; and tracing, constructive trusts, and equitable liens. (Examination) (Spring—day)

240 **Equity** (2)
Evolution of equity jurisprudence and its administration of a remedial scheme separate and distinct from that administered by common law jurisprudence. Constitutional and systemic limitations upon equity. Effect of merger of common law and equity courts on the federal and state level. Temporary and permanent injunctive relief; specific performance, cancellation, restitution, reformation, constructive trusts, equitable liens, marshaling, equitable writs, and equitable defenses, such as *laches, estoppel in pais,* and "unclean hands." Relative efficacy and availability of equitable and legal remedies. (Examination)

244 **Comparative Military Law** (2) Gierke, Gilligan
Analysis and critique of the broad concept of a separate military justice system; similarities between rules of evidence and rules of criminal procedure in the military and civilian systems; the role of Congress in overseeing the military criminal system; application of the First, Fourth, Fifth, and Sixth Amendments to service members; and broad policy issues such as the systemic challenges to the military justice system. (Examination or research paper with permission of the instructor) (Fall—evening)

246 **Appellate Practice** (2) A. Sloan
Study of the philosophy and mechanics of the appellate process through assigned readings, lecture, brief student oral presentations, and class discussion. The course will focus on the interplay or tension between procedural and substantive law, fact and law, merit and advocacy, deference and fairness, and the effect of these factors on the disposition of individual appeals and the clarification of law by appellate courts. (Research paper) (Spring—day)

249 **Civil Procedure Seminar** (2)
Selected topics in civil procedure to be announced at the time of registration. Enrollment is limited. (Research paper)

Commercial, Business, and Labor Law

250 **Corporations** (4) Mitchell, Wilmarth, Gabaldon, Galston, Bratton
Corporate law, with emphasis on operations and financing of corporations. Control of corporations, action by corporate directors, officers, shareholders. Control devices. Directors' and shareholders' duties of care and loyalty, insiders' transactions in shares of the corporation. Derivative suits, kinds of shares, dividends, corporate distributions. (Examination) (Fall—day and evening, spring—day)

252 **Securities Regulation** (3) Gabaldon
The basic course in the study of federal and state laws governing the offering, distribution, and trading of securities. Focus on federal laws and regulations, in particular the Securities Act of 1933, the Securities Exchange Act of 1934, and the enforcement of these laws by the SEC and private parties. Prerequisite: Law 250. (Examination) (Spring—day)

254 **Corporate Finance** (2 or 3) Mitchell
General introduction to finance theory; problems in the issuance and reacquisition of corporate securities; analysis of various types of securities; problems involved in the use of debt and payment of corporate dividends; and financial analysis of mergers, acquisitions, recapitalizations, dissolutions, and liquidations. Prerequisite: Law 250. (Examination)

256 **Takeovers and Tender Offers** (2)
Federal and state regulation of corporate takeover bids and tender offers, including theories of corporate acquisitions, the Williams Act, and regulation of takeover tactics and defenses. Prerequisite: Law 250. (Examination)

258 **Regulation of Securities Markets and Professionals** (2)
Federal regulation of securities markets and professionals, including regulation of exchanges, broker–dealers and investment advisers, internationalization of markets, and SEC administrative proceedings against broker–dealers and others. Prerequisite: Law 250. (Examination)

260 **Regulation of Investment Companies and Advisers** (2) Hirsch
Applicability of the Investment Company Act of 1940 to particular business activities that may bring an entity within the statutory definition of investment

company; litigation as to fees; policy considerations relating to front-end loads, SEC regulations regarding advertising and promotion, restrictions on activities by affiliates, and current SEC disclosure requirements. Applicability of the Investment Advisers Act of 1940 to activities of individuals and entities, procedures for compliance, First Amendment issues raised by SEC enforcement actions; and civil liability under the antifraud provisions of the securities laws. Recommended: prior or concurrent enrollment in Law 252. (Examination) (Spring—day)

262 Corporation Law Seminar (2) Hausfeld

Analysis of the nature and role of the business corporation in the American and transnational political economy: evolution of the corporation and the political economy; impact of technological change on the corporation and the political economy; reasons for and consequences of the growth of large corporate enterprises; role of entrepreneurs in the political economy; relationship of corporations to the government and other centers of power. (Research paper) (Spring—day)

264 Securities Law Seminar (2)

Selected topics in corporate and securities law practice and theory to be announced at the time of registration. Enrollment is limited. Prerequisite: Law 250. (Research paper)

266 Labor Law (2 or 3) Craver, Freilicher

Law governing labor–management relations, organizations and representation of employees, regulation of economic weapons, enforcement of collective bargaining agreements, interunion and intra-union relations. (Examination) (Fall—day; spring—evening)

268 Individual Employment Rights (2 or 3) Selmi

Individual rights and obligations in employment: survey of common law and statutory regulation of the individual employment relationship from its inception to its termination, emphasis on current developments such as wrongful discharge, medical screening, employer provided health insurance and child care, occupational safety and health, workers' compensation, and retirement issues. (Examination or take-home examination) (Fall—day)

272 Employee Benefit Plans (2) Mackiewicz, Quinn

The course begins with an examination of pre-ERISA benefit plans, the federal labor law governing those plans, and the conditions which led to the passage of ERISA and its effect on Taft-Hartley plans. Practical realities of collectively bargained benefit plans, preemption of state law and interplay of various federal laws; roles played by union and employer both in the context of individual bargaining of employee benefits and in the context of the employer and the union as trustee of a benefit plan; rights of participants and beneficiaries under the plan and under the collective bargaining agreement; rights and obligations of contributing employers; and termination and withdrawal issues, including plant shutdowns and bankruptcies. (Take-home examination) (Spring—day)

274 Labor Standards (2) Ginsburg

Analysis of the Fair Labor Standards Act—its scope, exemptions, and remedial procedures; the laws establishing labor standards for government contracts, including the Davis-Bacon Act, Walsh-Healey Act, Service Contract Act, and Work Hours Act; the role of the Department of Labor, the Comptroller General, and the contracting agencies in interpretation, administration, and enforcement of these statutes. (Examination)

276 Labor and Employment Law Seminar (2)

Selected topics in labor and employment law to be announced at the time of registration. Enrollment is limited. (Research paper)

280 Secured Transactions (2 or 3) Zubrow

Basic course on the law governing asset-based financing for business and consumer debtors, including the study of how secured transactions are structured, how priority disputes among creditors over personal property collateral are resolved, and how secured creditors collect from debtors in default. Primary emphasis is on Articles 9 and 2A of the Uniform Commercial Code, as well as several federal statutes affecting credit sales and lending transactions secured by personal property. (Examination) (Spring—day and evening)

282 **Commercial Paper—Payment Systems** (2 or 3) G. Maggs
Classic view of negotiable instruments as codified by Article III of the Uniform Commercial Code. Check collection: the system in theory as expressed in Article IV of the Uniform Commercial Code and the system in practice; Federal Reserve regulations, Clearing House agreements, and automation systems. The dual banking system, work of the Comptroller General and the Federal Reserve Board. Legal problems concerning interest and the checkless society. (Examination) (Spring—evening)

284 **Creditors' Rights and Debtors' Protection** (3 or 4) Zubrow, Galston
Creditors' remedies and debtors' protections under state law: writs of attachment, garnishment and execution, acquisition of liens and forced sales of property, self-help arrangements, and security agreements. Bankruptcy under federal law: who may file, the creation and administration of the bankruptcy estate, powers of the trustee, discharge of debt; rehabilitation plans for individuals under Chapter 13. (Examination) (Fall—day; spring—evening)

286 **Consumer Protection Law** (3)
Examination of common law doctrines and Federal Trade Commission case law and a variety of federal and state statutes and regulations thereunder. Statutes to be considered include Truth in Lending, Fair Credit Billing, Equal Credit Opportunity, Fair Debt Collection Practices, Magnuson–Moss Warranty Acts, Uniform Commerical Code provisions applicable to consumer sales and transactions, unfair trade practice laws, usury laws, and automobile "lemon" laws. Comparison of regulatory and remedial techniques available through case law, general statutory provisions, and specifically targeted technical statutes; public and private enforcement mechanisms, including litigation and alternative dispute resolution. (Examination or research paper with permission of the instructor)

288 **Commercial Law Seminar** (2) Meier, Tatge
Selected topics in commercial law to be announced at the time of registration. Enrollment is limited. (Research paper) (Spring—day)

290 **Banking Law I** (3) Buchman, Sczudlo
Federal regulation of the financial services industry, especially commercial banks. Includes an analysis of the Federal Deposit Insurance Corporation as insurer of deposits, receiver, and liquidator of troubled banks, the role of the Comptroller of the Currency as the primary federal regulator of national banks, including the chartering function, bank examinations, analysis of classified loans, capital adequacy, and enforcement of substantive federal legislation, operation of the Federal Reserve System under the Bank Holding Company Act and the various substantive regulations such as Reg. B (equal credit opportunity), Reg. J (check collection), Reg. M (consumer leasing), Reg. Q (deposit rate regulation), Reg. O (insider loan limits), Reg. E (electronic funds transfer), and Reg. Z (truth in lending); geographic deregulation and the trend toward interstate banking, and an analysis of financial services product deregulation and unification of the industry along functional lines. (Examination) (Fall—evening)

291 **Banking Law II** (2)
Bank holding companies; activities closely related to banking under FRB Regulation Y; outer limits of the business of banking; banks, bank holding companies, and the securities laws; savings and loan holding companies; Change in Bank Control Act, the FDIC and the troubled bank, bank liquidation and purchase and assumption arrangements, federal deposit insurance, the FDIC as receiver of a failed bank; international banking, including foreign banks in the United States, U.S. banks abroad, and foreign bank regulation of American banks abroad. (Examination)

292 **Banking Law Seminar** (2) Kroener
Selected topics in banking law to be announced at the time of registration. Enrollment is limited. (Research paper) (Spring—evening)

293 **Admiralty** (3) Sharpe
The maritime law applied in federal and state courts; admiralty jurisdiction and practice; litigation and arbitration; making uniform law by international convention. The U.S. law of seamen, shoreside workers, and personal injury and death in navigable waters; maritime liens and ship mortgages; carriage of goods by water; collisions at sea; salvage, general average, and limiting liability for private damage and environmental harms. (Examination) (Spring—day)

294 **Agency and Partnerships** (2) Lord
Employment relations, vicarious liability of employers for employees' torts, scope of employment, and independent contractors; agents' authority and apparent authority to contract for their principals; ratification; nonprofit associations; the formation, operation, and termination of partnerships; limited partnerships. (Examination) (Spring—day)

295 **Sports Law** (2 or 3) Carter, Schmidtlein, J. Banks
Selected historical and contemporary issues involving amateur and professional sports, including contract, arbitration, labor law, antitrust, business planning, Title IX, and common ethical issues arising in the representation of athletes. (Schmidtlein, Banks—focus on professional sports only) (Carter—examination and drafting, negotiation, and/or writing assignments. Schmidtlein, Banks—examination) (Fall—day; spring—evening)

296 **Business Planning** (2) Jones, Flyer, Press, Cooney, Cirulnick
Integrated study of corporate, tax, accounting, and securities law aspects of the following: choice and formation of a closely-held business entity; structure of equity and control of a corporate entity; providing for changes in stock ownership; providing for the mid-life of a corporation, including buy outs and recapitalizations; and analysis formulation of planning for a corporate acquisition. Analysis of hypothetical problems and practical solutions and insights into the practice of the business lawyer. Prerequisite: Law 250 and 300. Law 302 is recommended. Enrollment is limited. (Problem assignments) (Fall—evening; spring—day and evening)

297 **Entertainment Law** (2)
Overview of legal problems in film, theater, television, music, and publishing industries. Topics include the role of agents and managers, contractual provisions in different entertainment industries, protection for ideas and stories, right of publicity, and advanced copyright issues. Prerequisite: Law 472 or permission of the instructor. (Examination and negotiation and drafting exercises)

298 **Insurance** (2) Wald
A primary risk-distributing medium and the rules by which legislative, administrative, and judicial bodies seek to promote its benefits and avert its dangers. Insurance marketing, insurable interest, subrogation, transfer of insurance benefits to nonpolicyholders, coverage and other insurance policy provisions, disposition of claims. (Examination) (Fall—day; spring—evening)

Taxation

300 **Federal Income Taxation** (3 or 4) Peroni, Block, Halpern, Brown
Survey of substantive provisions of federal income tax law, including concept of gross income, provisions affecting taxation of family and individual transactions, limitations on allowable deductions, sales and dispositions of property, problems of capital gains taxation, nontaxable exchanges. (Examination) (Fall—day and evening; spring—day)

302 **Corporate Taxation** (3) Block, Brown
Continuation of Law 300. Primary emphasis on corporate–shareholder relationships. Problems of corporate dividends, redemptions of stock, stock dividends, bail-outs, and dividends in kind. Federal income tax problems involved in the formation of corporations, the sale of corporate businesses (including collapsible corporations), mergers and acquisitions, and corporate divisions. Prerequisite: Law 300. (Examination) (Spring—day and evening)

304 **Partnership Taxation** (2 or 3) Sanders
Income tax problems of partnerships, limited liability companies, and S corporations (Subchapters K and S of the Internal Revenue Code), including a comparison of the advantages, disadvantages, and differences among three types of pass-through entities. Practice-oriented study of partnerships, including syndication, organization, and structure of entity, with emphasis on policy examination of areas of IRS principal concern, including disproportionate tax allocations, guaranteed payments to partners, contributions of capital, basis for gain or loss, passive activity losses, non-recourse financing, current and liquidating distributions, sale of partnership interests, collapsible partnerships, termination, special basis adjustments, and distributions to retiring or deceased partners. Planning-oriented analysis of Subchapter S, including procedures for electing

and terminating Subchapter S status, treatment of income and losses, limitations on deductibility of losses, and how to avoid pitfalls. Prerequisite: Law 300; recommended: Law 302. (Examination) (Spring—evening)

306 **Estate and Gift Taxation** (2 or 3) Nudelman
Survey of substantive provisions of federal estate and gift tax laws, including inter vivos transfers, transfers in contemplation of death, joint interests, life insurance proceeds, property subject to powers of appointment, marital deduction, and split gifts. When offered for 3 credits, the course includes skills-training exercises designed to augment class discussion and lectures. (Examination) (Fall—evening)

307 **Pension Law and Taxation** (2) D. Morgan
Survey of the structure and operation of tax-qualified pension, profit sharing, and stock-bonus plans under X401(a) of the Internal Revenue Code. Requirements for obtaining and maintaining IRS approval. (Examination) (Spring—evening)

308 **Real Estate and Income Taxation** (2) Howe
The effect of income taxes on the real estate market and real estate transactions: sales and exchange of real estate interests; various entities for the ownership and development of real estate; the impact of taxes on the landlord and tenant; the impact of taxes on the mortgagor and mortgagee, including the choice of financing techniques, such as sale-leaseback; depreciation, amortization, and obsolescence; basis and basis adjustments; and casualties and other involuntary conversions. Prerequisite: Law 300. Law 302 is suggested but not required. (Examination)

310 **Natural Resources Taxation** (2)
Application of federal income tax law to producing segment of oil and gas industry. Classification of interests; treatment of exploration and development expenditures. Depletion allowance and concept of economic interests. Sales vs. leasing transactions. Organization problems. Prerequisite: Law 300. (Examination)

312 **International Taxation I** (2 or 3) Peroni
Federal income tax law and policy regarding foreign persons with business and investment activities in the United States ("inbound foreign investment"). Topics include jurisdiction to tax, status as foreign or U.S. taxpayer, source of income and deduction apportionment rules, withholding taxes, tax treaties and anti-treaty-shopping rules, disposition of U.S. real property by foreign taxpayers, branch profits tax, and an introduction to foreign tax credit issues. Prerequisite: Law 300 or permission of the instructor. (Examination) (Fall—evening)

313 **International Taxation II** (2) Brown
Federal income law and policy regarding U.S. persons with business and investment activities abroad ("outbound foreign investment"). Topics include advanced foreign tax credit issues, anti-income-deferral rules, international sale of goods, licensing of intellectual and other property, transfers of property to related and unrelated parties, treaty issues, international joint ventures, and foreign currency rules. Prerequisite: Law 312. (Examination) (Spring—day)

314 **Nonprofit Organizations: Law and Taxation** (2) Hill
Study of charities and other nonprofits as regulated by both federal and state laws. Topics include tax status of nonprofits, fiduciary standards applicable to their officers and directors, liability laws for nonprofits and their volunteers, and enforcement questions. Discussion of the lobbying and political activities of nonprofits, their commercial activities and the related charge of unfair competition, the extent to which nonprofits are subsidized, the justification for subsidizing them, and standing issues. Enrollment may be limited. Prerequisite: Law 300. (Examination or research paper with permission of the instructor) (Spring—day)

316 **State and Local Taxation** (2) Brunori
Taxation by state and local governments: problems of real and personal property taxation, sales and use taxes, business and personal income taxes. Limitations on taxation of interstate commerce. Congressional problems. (Examination or research paper with permission of the instructor) (Spring—day)

318 **Tax Policy Seminar** (2) Halpern
Intensive study of selected aspects of the tax structure with primary attention given to the federal income tax. Problem areas are reviewed primarily from the

standpoint of tax policy, including legal, economic, social, and practical considerations. Alternative solutions, including current legislative proposals, are examined. Enrollment is limited. Prerequisite: Law 300. Recommended: Law 302. (Research paper.) (Spring—day.)

Property, Family Law, and Torts

330 Modern Real Estate Transactions (3) Brauneis

Basic course in conveyancing. Current problems in purchase and sale of residential real estate; legal and equitable rights, responsibilities, liabilities, and remedies of buyer, seller, broker, escrow agent, conveyancing attorney, title examiner, abstractor, and lender; interim and permanent mortgage finance; discounts, points, "subject-to" and "assumptions," remedies on default, including foreclosure processes; process of examination and assurance of title and other interests in realty, including recording and title insurance systems; settlements and closings; warranties of title; encumbrances on title; and clearing of title; emerging problems related to cooperatives, condominiums, and property owners associations. (Examination.) (Fall—day.)

332 Land Use Law (2) Feola, Gordon

Problems, solutions, emerging concepts, and constitutionality of land use regulations, including zoning, subdivisions, historic preservation, exactions, vested rights, transfer of development rights, growth management, and urban and regional planning. This course provides the foundation for Law 336. (Writing assignments and examination.) (Fall—evening.)

334 Law of Real Estate Financing (2) Stuart

Types of lenders, choice of entity, construction loans, permanent financing, lenders' obligations, remedies, and liabilities, title insurance, survey, and liens, ground lease and commercial lease, leasehold mortgage, joint ventures, alternate capital formation; opinion letters. (Examination.) (Fall—evening.)

336 Land Development Law (4) Drachsler

Students participate in a semester-long simulation process encompassing 42 months of "game time." As junior associates in various hypothetical law firms or offices, students represent their assigned clients, with all interactions based on actual situations and often incorporating recent or ongoing cases of major significance. All levels of judicial, administrative, and legislative activity are involved. Enrollment limited by instructor. (Writing assignments.) (Spring—evening.)

338 Housing Rights Law (2) Cunningham

Study of major housing rights of low-income persons, including tenant rights in landlord–tenant courts. Review of litigation strategies to address systemic violations of housing rights, such as racial and other forms of discrimination in the provision of shelter, housing, and neighborhood revitalization. (Research paper and writing assignments.) (Fall—day.)

340 Property and Real Estate Seminar (2) Brauneis

Selected topics in property and real estate law to be announced at the time of registration. Enrollment is limited. (Research paper.) (Spring—day.)

342 Trusts and Estates I (3 or 4) Johnston, Tuttle, Edmisten, Hall

Noncommercial transfers of wealth at death or during life; essential elements and formalities for creation of trusts and execution of wills; revocation and alteration; grounds for contest; limits on property owner's power to control; intestate succession. (Examination and problem assignments.) (Fall and spring—day and evening.)

343 Trusts and Estates II (2) Bradford

Dispositive provisions with regard to property transfers; wills and trusts; common questions of construction; future interest problems; administration of estates and trusts; charitable trusts. Prerequisite: Law 342. (Drafting assignments and examination.)

346 Estate Planning Seminar (2) Nudelman

Study of the effective acquisition, management, and disposition of wealth by lifetime transactions and testamentary transfer. Emphasis on federal income, estate, gift, and generation-skipping transfer taxation. Problem assignments address probate avoidance; interspousal transfers; jointly owned assets; transfers to minors; irrevocable trusts; closely held family and business interests; post-

mortem estate planning, retirement planning, and charitable giving. Prerequisite: Law 306 for 3 credits and Law 342. Enrollment is limited. (Drafting assignments) (Spring—evening)

348 **Family Law** (2 or 3) Meier, Babb, Reiser
Survey of family law, including statutory law of domestic relations and constitutional restraint on state regulation of the family. Topics include marriage, divorce (including child custody, property division, alimony, and child support), domestic violence, reproductive rights, and family privacy. The course draws on historical and interdisciplinary materials and involves discussion of public policy issues as well as current law. (Examination) (Fall—evening; spring—day; summer)

349 **Family, Child, and State** (2 or 3) Ross
Examination of the allocation of power and responsibility among parent, child, and state. Topics include freedoms under the First Amendment, education, health care including procreation, child abuse and neglect, custody, adoption, and juvenile delinquency. Sociological/psychological perspectives on the parent–child relationship. Enrollment is limited. (Examination) (Spring—day)

352 **Family Law Seminar** (2) Ridder, Ross
Group study of historical and contemporary problems in the theory and practice of family law. Specific topics to be announced. Enrollment is limited. Prerequisite: Law 348 or 349. (Examination or research paper with permission of the instructor) (Spring—day)

353 **Legal Problems of the Elderly** (2 or 3) Schuster
Topics may include Medicare and Medicaid, financing health care, and related policy issues; health care decision making, including informed consent and advance health care directives; issues related to the right to die, including euthanasia and doctor-assisted suicide; long-term health care issues, including nursing homes and other alternatives, insurance, monitoring, and quality of services; guardianships and other procedures in the event of age-related disabilities; Social Security and Supplemental Security Income; housing issues, including tax incentives, retirement communities, and continuing care facilities (Examination) (Spring—day)

354 **Products Liability** (2 or 3) Schotland
Theory and practice of product liability litigation. Compensatory and punitive damages; competing strategies pursued by plaintiffs and defendants. Affirmative defenses and defense strategies. Failure-to-warn and defective design cases. Discovery techniques. Settlement strategy and mediation of product liability cases. Class actions and multidistrict litigation involving defective products. Differences between U.S. product liability litigation and other countries' systems. (Examination or research paper with permission of the instructor) (Spring—day)

358 **Advanced Torts Seminar** (2)
Selected topics in torts law to be announced at the time of registration. Enrollment is limited. (Research paper)

Criminal Law and Procedure

360 **Criminal Procedure** (3 or 4) Cheh, Saltzburg, Butler, Lettow, Rosen
Comprehensive presentation of major issues in criminal process, with heavy reliance on Supreme Court cases interpreting the Constitution. The course proceeds through the criminal justice system, from first police contact, search interrogation, and other investigation, through the prosecution, preliminary proceedings, and trial. Problems of federalism, the exclusionary rule, and sentencing. (Examination) (Fall—day; spring—day and evening)

362 **Adjudicatory Criminal Procedure** (2) Starrs
Sources of Rules of Criminal Procedure, bail, preliminary hearing, the decision to prosecute; the grand jury; discovery; voir dire; motions practice; capital punishment; collateral remedies; and sentencing. (Examination) (Fall—evening; spring—day)

364 **White Collar Crime** (2) Casino
Definition, prosecution, and sanctioning of federal corporate and white collar crime offenses. Examination of special problems in the prosecution and the defense of such offenses. Exploration of primary white collar offenses in the

federal system, e.g., mail and wire fraud, securities fraud, insider trading, bribery of public officials, and environmental crimes. Examination of sanctions for corporate and individual offenders. (Examination) (Fall—evening, spring—day)

366 **Law and Criminology** (2) Chambliss

The role that criminological knowledge of crime causation may play in assisting lawyers to appraise the effectiveness of various alternative social and legal devices in controlling deviant behavior. The search for factors related to criminal behavior will be developed historically, with emphasis on current causal theories developed by various disciplines. Model as well as operational penal codes, sentencing and probation practices, and specialized facilities will be analyzed in terms of their relationship to such causal theories. (Examination) (Spring—day)

368 **Law of Criminal Corrections** (2)

Study of the development and current use of society's three major approaches to the handling of offenders: punitive, incapacitating, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, research findings concerning effectiveness of these responses. Analysis of treatment strategies to facilitate communication between members of the legal profession and behavioral scientists charged with effectuating these strategies. Prerequisite: Law 366. (Examination)

370 **Forensic Science** (2) Starrs, Melson

Designed to acquaint the student with the operations of a modern crime laboratory and the courtroom acceptability of testimony of forensic scientists and other evidence on laboratory test results. Identification of individuals (fingerprints, palmprints, footprints, voiceprints, anthropological reconstruction, hair identification, and serology), identification of objects (ballistics, handwriting, typewriting, fiber identification, paints, varnishes, glass, wood, and paper), toxicology, pathology, forensic use of the microscope and the camera, the coroner and the medical examiner systems, and drug law enforcement. Crime laboratory guest lecturers. (Examination) (Fall—evening, spring—day)

372 **Drugs and the Law** (2) Strulmk, Meyers

A study of federal and state laws controlling illicit drugs, including the historical evolution of these laws, current offenses and penalties, constitutional limits on the criminal sanction, enforcement practices, and sentencing considerations. Alternative models for controlling drugs, including decriminalization and legalization will also be studied. Six class sessions will be devoted to mock criminal trials at which student teams conduct direct and cross-examination of guest expert witnesses in the field. Other students may be assigned to internships with the U.S. Attorney's Office, Public Defender Service, or other institutions involved in drug law or policy. All participants will be graded on the basis of assigned memoranda pertaining to the legal issues involved in the mock hearings or internships, or special research papers assigned by the instructors. Prerequisite: Law 230. (Writing assignments) (Spring—day)

374 **Federal Sentencing Seminar** (2) Gelacak

In-depth analysis of federal sentencing under the Sentencing Reform Act of 1984, with a focus on federal guidelines and the changing role of the courts. The history of sentencing, guideline interpretation, and future directions. Relationship of federal and state systems. Congress and the courts, and the role of quasi-judicial bodies in the criminal justice system. Prerequisite: Law 300 or permission of the instructor. (Research paper) (Spring—day)

376 **Prisoners Project** (1, 2, or 3) Turley

Open to second- and third-year students. A clinical project concerned with the legal status of older prisoners (over 55 years of age). The project works for the release of high-cost, low-risk prisoners into stable environments. Students work on either individual cases or research. Case workers interview prisoners to evaluate and prepare cases for pardon, parole, or possible *habeas* appeals. Research projects will cover subjects ranging from overcrowding to health care to risk assessment. Some legislative work is also possible. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. This course is graded on a *CR/NC* basis. (Fall, spring, summer)

379 **Criminal Law and Procedure Seminar** (2) Lotke

Selected topics in criminal law and procedure to be announced at the time of registration. Enrollment is limited. (Research paper)

Constitutional Law and Civil Rights

380 **Constitutional Law II** (3 or 4) Dienes, Barron, Cheh, Rosen
Individual rights and liberties in the American constitutional scheme and the different judicial methods of reconciling majoritarian governance with individual freedom. Privileges and immunities of national citizenship, due process of law, equal protection guarantees, freedom of expression and of religion, rights of privacy and association. Credit may not be earned for both Law 380 and 381. (Examination) (Fall—day and evening)

381 **The Civil War Amendments: 13th, 14th, and 15th** (3) Rosen
Individual rights and liberties in the Thirteenth, Fourteenth, and Fifteenth Amendments to the Constitution and the different judicial methods of reconciling majoritarian governance with individual freedom. Privileges and immunities of national citizenship, due process of law, equal protection guarantees, rights of privacy and autonomy, and voting rights. Credit may not be earned for both Law 380 and 381. (Examination)

382 **The First Amendment** (3) Lupu
The rights of expression, association, and religious freedom recognized by the First Amendment to the U.S. Constitution. Categories of unprotected expression (e.g., obscenity) and less-protected expression (e.g., commercial speech). Issues of time/place/manner regulation, speech in public fora, regulation of political campaigns. Constitutional burdens and benefits unique to religion. Material includes Supreme Court decisions and secondary literature on these subjects. (Examination) (Spring—day)

384 **Law of Separation of Powers** (3)
An examination of the law that governs the interrelations of the three branches of the federal government. Topics include the constitutional history of our governmental structure, the immunities of members of Congress and of executive officers, impeachment, congressional power over federal jurisdiction, executive orders and the limits of presidential "lawmaking," presidential and legislative vetoes, executive privilege, executive and congressional oversight of policy through supervision of the bureaucracy, controls on spending including impoundment, limits on presidential discretion to enforce the laws (e.g., special prosecutors), Congress's and the president's roles in foreign affairs (executive agreements, claims settlements, treaty powers), and congressional and presidential war powers. Emphasis will be placed on the role of the lawyer as government advisor, a role performed by many attorneys at all levels of government. (Examination)

386 **Foreign Relations and National Security Law** (2 or 3) Raven-Hansen
Examination of legal issues raised by national security abroad (including general war, imperfect war, covert war); internal security (including emergency powers, domestic uses of the military, surveillance and surreptitious entry and federal personnel security); and access to national security information (the FOIA, state secrets privilege, prior restraints, and leak control). Includes study of the incorporation of international law (treaties, agreements, and custom) into U.S. law. (Examination and optional paper) (Fall—day)

388 **Civil Rights Legislation** (3) Selmi
Examination of federal legislation protecting individual rights and liberties as well as the administrative and judicial implementation of that legislation. Remedial provisions for the enforcement of federal constitutional and statutory rights (e.g., 42 U.S.C. §§1983, 1985) and federal statutes prohibiting discrimination in housing, contractual relations, voting, education, and federally funded programs. Prerequisite: Law 380 or 381. (Examination or take-home examination) (Fall—day)

389 **Civil Rights and Civil Liberties in Education** (2)
Overview of the law governing the administration of education: the relations among students, schools, and faculty; freedom of expression and the establishment of religion in educational settings; school desegregation and equal opportunity issues; gender discrimination and related topics. (Examination or writing assignments with permission of instructor)

390 **Employment Discrimination Law** (2 or 3) Selmi, Morris
Federal laws and executive orders relating to various types of discrimination in employment, including Title VII of the Civil Rights Act of 1964, the Civil Rights

Act of 1991, the Equal Pay Act, the Age Discrimination in Employment Act, the Rehabilitation Act, the Americans with Disabilities Act, the Civil Rights Act of 1866, the Fourteenth Amendment, the National Labor Relations Act, and Executive Orders 11,246 and 11,375 relating to government contractors; substantive rights, exemptions, and burdens of proof under the various laws and regulations. (Examination) (Fall—evening; spring—day)

392 Gender Discrimination and the Law (2) Ridder

An examination of the treatment of women in all areas of the law and legal remedies for sex discrimination. Emphasis on constitutional law, family law, and discrimination in employment. Enrollment limited to 30 students. (Examination or research paper) (Fall—day)

394 Sexuality and the Law (2 or 3) Schaffner

Examination of the relationship between sexuality and the law, focusing primarily on the treatment of lesbians, gay men, and bisexuals in the areas of family law, employment law, constitutional law, and criminal law. Topics include how the legal system regulates and affects bisexual, lesbian, and gay sexual behavior, open expressions of lesbian, gay, and bisexual identity, workplace effects, lesbian, gay, and bisexual relationships, and lesbian and gay parenting. (Examination) (Fall—day)

395 Constitutional Law and the Supreme Court (2) Garre

Analysis of selected cases currently pending before the Supreme Court. Students read briefs and related materials (such as lower court decisions and controlling cases) in cases scheduled for oral argument, discuss the cases in class, vote on how they would decide the cases, and then draft opinions for class circulation and review. Each student will be required to draft two lengthy majority opinions, a concurrence, and a dissent. The course will also focus on how the Supreme Court works both as an institutional and practical matter. (Writing assignments) (Spring—day)

397 Federal Indian Law (2) Alexander

Basic legal principles that govern the relationship between American Indian tribes, the federal government, and the state governments. Focus on jurisdictional disputes between those governments, the source and scope of Indian sovereignty, and recognition and enforcement of Indian land and treaty rights. (Examination or research paper with permission of the instructor) (Fall—evening)

398 Law of Privacy (2) Park

A review of the law of privacy as it has developed in constitutional litigation, tort law, and state and federal statutes. Current developments and rationales for further expansions of privacy rights are considered. (Research paper) (Spring—day)

399 Constitutional Law Seminar (2) Lupu, Rosen

Selected topics in constitutional law to be announced at the time of registration. Enrollment is limited. (Research paper) (Fall and spring—day)

Administrative Law and Government Regulation

400 Administrative Law (3) Schwartz, Park, Banzhaf, Pierce, Siegel, Franklin

Study of the administrative processes of government in executive and independent agencies. The federal Administrative Procedure Act is emphasized, with particular attention to adjudication, rulemaking, judicial review, investigatory powers, and enforcement. Study may include comparative state administrative law. Constitutional topics include separation of powers and due process. (Examination) (Fall—day; spring—day and evening)

402 Antitrust Law (3) Pierce, Kovacic

Federal antitrust law and policy under the Sherman, Clayton, and FTC Acts: basic economic theory of free-market operation, the Rule of Reason and *per se* offenses, price fixing, market division, and boycotts; trade association activities, monopolization and attempts to monopolize, mergers and joint ventures, resale price maintenance and other vertical restraints, exclusive dealing and tie-in agreements, selected exemptions from antitrust liability. (Examination) (Spring—day and evening)

404 **Unfair Trade Practices** (3) Schechter
Unfair trade practices at common law and under modern legislation; privilege to enter markets and compete, interference with contractual relationships, trademarks and trade names; imitation of product appearance; misappropriation of ideas and trade secrets; right of publicity; protection of competitors and consumers against false advertising and unfair or deceptive practices under the Federal Trade Commission Act, the Trademark Act, and state unfair trade and consumer protection statutes. Credit may not be earned for both Law 404 and 474. (Examination or take-home examination) (Fall—day)

406 **Regulated Industries** (2 or 3) Pierce
Substantive problems of business regulation in terms of natural monopolies, licensed industries, health, safety, and rate regulation. Typical problems raised include the impact of regulation upon management and market behavior, the uses of economic evidence, and the effects of judicial and legislative review. (Examination)

408 **Food and Drug Law** (2) Safir, Adams
Consideration of the standards of federal law applicable to the compositional and representational elements of foods, drugs, medical devices, and cosmetics. Provisions of the Federal Food, Drug, and Cosmetic Act, their development, application, and judicial and administrative interpretation. (Research paper or examination) (Spring—evening)

410 **Health Care Law** (2 or 3) Rosenbaum
Survey of the history, structure, and operation of the health care delivery system, and related legal and policy issues. Emphasis on public and private health care financing, antitrust, fraud and abuse, and managed care. Concepts and terms of health care delivery, particularly the design, finance, and administration of current and proposed arrangements. (Examination or examination and research paper) (Fall—day)

411 **Health Care Law Seminar** (2) Steele
Intensive study of the health care industry, focusing on one or more of the following topics: liability arising out of managed care, ERISA preemption of state health laws, and a study of various federal antitrust statutes as they pertain to health care. (Research paper) (Spring—day)

412 **Print Media Law** (2 or 3) Dienes
Study of the text, historical origin, and theoretical foundation of the Press Clause and of the role played by the mass media in modern society. Examination of the common law and constitutional protection accorded mass media publishing in areas such as libel law, the law of privacy, and liability for physical, emotional, or economic harm. The legal status of newsgathering, including journalist's privilege and access to information possessed by government. Problems of reconciling freedom of the press with guarantee of a fair trial. Government regulation of commercial speech, including advertising and promotion. Prior or concurrent enrollment in Law 380 is recommended. (Examination) (Spring—day)

413 **Broadcast and Cable Regulation** (2 or 3) Barron
Study of the origins and development of electronic media and an examination of the continuing debate over regulation and deregulation of broadcasting. The allocation of the broadcasting spectrum, licensing and licensing renewals, and regulation of programming content. Problems posed by concentration of media ownership and the efforts to promote minority participation in ownership and management of broadcasting. The relation of government to public (noncommercial) broadcasting. The development of cable television and problems in regulation and deregulation, including issues of jurisdiction, franchising, syndication or programming, regulation of content control, and mandatory public access. The emergence of new communications technologies and the legal problems they pose. (Examination) (Spring—day)

414 **Telecommunications Law** (2) Brands
Regulation of telephone and related industries. Topics include competition in local-exchange and long-distance service before and after the 1996 Telecommunications Act, federal and state regulatory jurisdiction, universal service issues, and regulation of video, wireless, and Internet services offered by telephone and other telecommunications carriers. (Examination) (Spring—evening)

416 Legislation (2 or 3)
Block, Cacozza
Legislative process and the construction and legal effect of statutes. Topics that may be considered include representational structures, lobbying, judicial review, direct democracy, legislative fact-finding and drafting, and the preparation and significance of legislative history. This course is a prerequisite to several advanced public law courses. (Examination) (Fall and spring—day)

418 Legislative Analysis and Drafting (2)
Smith, Bergman, Goodloe
Instruction in the basic skills necessary for translating the specifications of the policymaker into legislation. Topics include determining policy objectives and an appropriate legislative scheme for their achievement, an overview of the legislative process, typical provisions in legislation, organizational issues in drafting, and the structural component of legislation. Enrollment is limited. (Drafting assignments) (Fall and spring—evening)

420 Government Lawyering Seminar (2 or 3)
Focus on a range of topics unique to government or government litigation, including conflict of interest regulations and other ethical rules. Litigation topics may include sovereign immunity, litigating and settlement authority, intergovernmental and executive discovery privileges and problems, remedies, and misconduct defenses against government. Apart from litigation, topics may include access rights and exemptions under the Freedom of Information, Privacy, Sunshine, and Federal Advisory Committee Acts, civil service regulations and federal employee rights, the federal budget process, congressional oversight and investigatory authority, and executive regulatory oversight. Enrollment is limited. (Research paper)

422 Local Government Law (2)
Schilling
Survey of the legal authority of city, county, and special-district local government units. Topics include the dynamic relationship of municipal governments with state and federal agencies, recent U.S. Supreme Court decisions affecting local governments, organizational structure and internal decision-making processes in metropolitan and other municipal level governments, and the procedures for changing the form and function of local governments (e.g., annexation), local legislative and administrative authority and processes (e.g., municipal police powers), municipal finance, responsibility in tort and insurance issues, introduction to community and regional land use planning, and joint power agreements and intergovernmental compacts. (Examination or research paper with permission of the instructor) (Spring—day)

426 Public Law Seminar (2 or 3)
Siegel
Selected topics in public law to be announced at the time of registration. Enrollment is limited. (Research paper)

Environmental Law

430 Environmental Law (2 or 3)
Turley, Ruhl
An introduction to the basic theories and statutes of environmental law, designed to develop an equal understanding of why and how environmental activity is regulated. There will be heavy focus on the reasons for regulation and the theories behind environmental protection. These theoretical foundations range from the economic school to the "eco-centric" school. The course begins with a discussion of common law remedies for environmental injuries such as nuisance and torts remedies. Turning to the regulatory alternative, the course will focus on a single primary command and control statute, the Clean Air Act, to emphasize the practical and legal issues surrounding the regulation of the environment. Other statutes, including the National Environmental Protection Act (NEPA), the Clean Water Act (CWA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) will also be discussed to a lesser extent. Not for credit toward an LL.M. in environmental law. (Examination) (Fall—day; spring—evening)

432 Air Pollution Control (2 or 3)
Ruhl
An in-depth analysis of the Clean Air Act. Topics include the history of air pollution control, air quality planning, standard setting, technology-based controls, incineration, indoor air pollution, permitting, and control of electrical utilities. (Examination) (Fall—evening)

433 **Environmental Law Enforcement** (2 or 3) Reitze
Enforcement procedures found in federal environmental laws, including record-keeping, monitoring, inspections, administrative compliance orders and penalties, civil penalties, and criminal penalties. Emergency responses, citizen suits, attorney fees, and equitable remedies are covered. Prerequisite: Law 430, 432, or 434. (Examination)

434 **Water Pollution Control** (2) Grumbles
Introduction to water pollution control and the Clean Water Act, with emphasis on water quality requirements and policies affecting industrial, municipal, and agricultural development interests. Related federal laws and policies involving wetlands, watersheds, coastal pollution, oil spills, groundwater, and safe drinking water. (Examination) (Fall—evening)

435 **International Trade and Environmental Law** (2) Campbell, Van Hoogstraten
The relationship between international trade and environmental law, with emphasis on the newly created World Trade Organization and the Uruguay Round agreements; regional trade agreements such as NAFTA; the effect of the 1994 General Agreement on Tariffs and Trade on national environmental and food safety standards; and the use of trade measures in environmental treaties such as the Montreal Protocol on ozone depletion, the Basel Convention on hazardous waste export, and the Convention on International Trade in Endangered Species. The relationship between the Biodiversity Convention and the treatment of intellectual property rights under GATT. (Examination) (Spring—evening)

436 **Water Resources Law** (2) Page
Federal and state powers over water; riparian and prior appropriation doctrines. Rights to surface use of water bodies; groundwater management; interstate allocation of water resources. Recommended as an introductory course. (Examination) (Fall—day)

437 **Coastal, Navigation, and Wetlands Resource Law** (2) Wood
Federal statutory and constitutional law governing the development, regulation, and protection of the waters of the United States, including wetlands. Focus on federal and state regulation and protection of wetlands and other aquatic resources, with special emphasis on Clean Water Act Section 404. Other topics include the evolution of federal authority over the navigable waters of the United States, legal issues involved in the planning, construction, and operation of federal water resource development projects by federal and state agencies (i.e., for navigation, flood control, hydropower, water supply, etc.); the federal navigation servitude; the Coastal Zone Management Act; the Marine Protection, Research, and Sanctuaries Act (i.e., the "Ocean Dumping Act"); the London Dumping Convention; and Fifth Amendment "regulatory takings." (Examination) (Spring—evening)

438 **Energy Law** (2 or 3) Hollis, Benkin
Survey of federal regulation of the major energy industries. Emphasis on federal controls affecting the natural gas, coal, oil, synthetic fuel, and electric industries. The course approaches energy regulation from a statutory and case standpoint, and also deals with practical, procedural issues. Enrollment is limited. Recommended for third-year students. (Examination) (Spring—evening)

440 **Natural Resources Law** (2) Dreher
Introduction to federal public lands (BLM lands, national forests, national parks, and national wildlife refuges) and the legal issues related to their multiple resource uses—forestry, mining, water, recreation, wildlife, endangered species, and wilderness. Principles of federal and state authority over these lands. Administrative law and practice governing land-management agency decision making and litigation challenging such decisions. Focus on topical case studies, statutory materials, and caselaw. (Examination) (Fall—evening)

441 **Regulation and Management of Ecosystems** (2) Page
Study of the recreational and preservationist uses of lands from the perspective of ecosystem management as an appropriate legal and managerial tool. The Surface Mining Control and Reclamation Act and the Endangered Species Act along with other laws regulating wildlife management will be examined. (Examination)

442 Control of Solid and Hazardous Wastes (RCRA & CERCLA) (2 or 3) Hourclé, M. Strand, Mounteer

Analysis of the federal and state laws and regulatory schemes relating to the control of toxic and hazardous substances. The Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act ("Superfund") are examined. (Hourclé, Strand—focus on RCRA and CERCLA issues faced by federal facilities) (Hourclé, Strand—problem assignments; Mounteer—research paper) (Fall—day; spring—evening)

444 Regulation of Pesticides and Industrial Chemicals (FIFRA & TSCA) (2) Fleuchaus, Culleen

Examination of federal regulation of pesticides and industrial chemicals. The portion of the course pertaining to pesticides focuses on the Federal Insecticide, Fungicide, and Rodenticide Act and the Federal Food, Drug, and Cosmetic Act: how risk assessment is used in the registration and cancellation of pesticides under FIFRA and tolerance setting under FFDCA. The second portion of the course focuses on the Toxic Substances Control Act and how it affects commercial production, processing, distribution, and use of chemicals. (Examination) (Spring—evening)

446 Nuclear Energy Law (2) Malsch

Analysis of the legal framework for regulation of nuclear energy in the United States and for dealing with proliferation of nuclear weapons abroad. Discussion of substantive technical and policy issues relating to nuclear power reactor safety, disposal of radioactive waste, and safeguarding nuclear installations against domestic nuclear terrorism. Focus of the legal discussion is on the U.S. Nuclear Regulatory Commission. Includes such topics as federal preemption, impact of the National Environmental Policy Act of 1969, conduct of adjudicatory hearings under the Administrative Procedure Act, compensation for injuries from nuclear accidents, and prelicensing antitrust reviews. (Research paper)

449 Toxic Tort Litigation (2) Hicks

The use of common law remedies to compensate those injured by diseases caused by toxins and characterized by long latency periods and, usually, relatively low levels of exposure. Insurance, workers compensation, and evidentiary issues. (Examination) (Fall—day)

450 Federal Facilities Environmental Law Issues (2) Hourclé

Analysis of the legal framework governing environmental law compliance at federal facilities. Review of a wide range of environmental, fiscal, and other laws that uniquely regulate federal installations and operations. Topics include the National Environmental Policy Act, statutes governing management and conservation of federal property, expenditure of federal funds, public involvement in federal environmental decision making, federal–state sovereignty issues, federal agency litigation, and professional responsibility issues. Prerequisite or concurrent enrollment: Law 432, 434, and 442 (Problem assignments) (Spring—day)

452 Environmental Issues in Business Transactions (2 or 3) Ruhl

Focus on applied environmental law. Emphasis on environmental compliance counseling, identifying environmental issues in business and real estate transactions, and drafting techniques to avoid environmental problems. Topics include environmental audits, securities disclosure issues, green advertising, criminal liability for officers, environmental liability for purchase of stock and corporate assets, lender liability, and partnership liability. Prerequisite: any environmental law course. (Research paper) (Spring—day)

454 International Environmental Law (2) Petsonk, DiLeva

The treaty negotiation process, role of international institutions in developing and implementing environmental agreements, relationship between environmental law and international issues, developing countries' perspectives on environmental issues, and social and cultural changes that affect the implementation of environmental law. Issues covered include climate change, export of hazardous waste, deforestation and biodiversity, Antarctica, and environmental concerns in war, human rights, and development financing. (Research paper) (Fall—evening)

456 Environmental Planning (2) Kussy

Impact of environmental laws on government decision making, including administrative law issues, comprehensive transportation planning, the National Environmental Policy Act, historic preservation, parkland protection, the Coastal

Zone Management Act, wetlands protection, farmland protection, the Endangered Species Act and other wildlife issues, mitigation of environmental impacts, role of governmental policies relating to the environment, legislative issues, and state environmental laws. (Examination)

458 **Environmental Negotiations** (2) Rogers, Juni
Survey of negotiations and related dispute resolution techniques in environmental matters, including those related to multi-party matters. Students complete interactive environmentally oriented negotiation and mediation exercises both in and outside of class. Prerequisite: completion of at least six hours of environmental law courses. Credit may not be earned for both Law 458 and 648. (Simulation and short papers) (Spring—evening)

462 **Law, Science, and Technology Seminar** (2)
The role of scientific findings and technological breakthroughs as they affect the development of legislation and regulations. Emphasis on developing an understanding of risk assessment as it is used in regulatory decision making and setting of environmental policy. The way in which each branch of the federal government deals with scientific and technological issues is also examined. (Research paper)

463 **Environmental Compliance and Enforcement Mechanisms** (2) Mason, Smyth
The various approaches to gain compliance with domestic and international environmental laws by individuals, businesses, and countries. Examination and analysis of compliance tools and mechanisms available in existing environmental laws. Consideration of effectiveness of compliance tools in analogous fields. (Research paper) (Spring—evening; summer)

464 **Environmental Crimes** (2) Mushal
Focus on the environmental criminal provisions of various federal environmental statutes, including the "mechanics" of a federal investigation, prosecution, the rationale for criminal penalties in the environmental area, and salient issues associated with these crimes. Students work on limited litigation projects. Students who complete this course are eligible to enroll in Law 465. Prerequisite or concurrent registration: Law 430 or permission of the instructor. (Examination) (Fall—evening)

465 **Environmental Crimes Project** (1 or 2) Turley
Focus on litigation and legislative projects relating to environmental crime. Students work on federal or state legislation to enhance both the existing environmental criminal laws and the resources available for their enforcement. Students also work with the instructor on developing environmental criminal cases around the country. Prerequisite: Law 430 and 464. The instructor's approval is required for enrollment. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. This course is graded on a *CR/NC* basis. (Writing and project assignments) (Spring)

466 **Environmental Law Seminar** (2) Ruhl
Selected topics in environmental law to be announced at the time of registration. May be repeated for credit provided the topic differs. Enrollment is limited. For LL.M. students; J.D. students may enroll only with permission of the environmental law program director. (Research paper) (Spring—day)

467 **Environmental Legislation Project** (1, 2, 3, or 4) Turley
Open to second-, third-, and fourth-year students with permission of the instructor. Legislative research and drafting projects related to environmental issues. Students work under supervision of the instructor in conjunction with federal and state legislators and committees to draft specific bills or background papers for congressional committees or state bodies. Enrollment is limited. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Prerequisite or concurrent registration: Law 430. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall and spring)

468 **Graduate Environmental Placement** (1, 2, 3, or 4) Reitze, Hourcle
The student works on a project in the environmental law field under the supervision of both the faculty director of the program and a lawyer practicing environmental law. The project may involve working with a government agency, a congressional committee, a private practitioner, or a nonprofit public interest environmental organization. Admission to the course is limited to LL.M. students.

with permission of the environmental law program director. Students may earn no more than a total of 4 credit hours for this course. This course is graded on a *CR/NC* basis. Five hours of work per week are required for each credit. (Fall, spring, summer)

Intellectual Property Law

470 Patent Law (2 or 3) Thomas, Adelman
An overview of patent law designed for students without a patent background, including those without a technical background. Analysis of the goals and costs of the patent law system. Topics include patentability requirements, infringement, remedies, patent prosecution issues, and patent transactions. (Examination) (Fall—day and evening)

472 Copyright Law (2 or 3) Thomas, Oman, Metalitz
Historical background and general survey; how copyright is secured and maintained; subject matter of copyright; scope of protection; duration, renewal, and termination of transfers; jurisdiction and remedies; contracts and combinations, including compulsory licenses and performing rights societies; other doctrines neighboring on copyright; international aspects of copyright, including the Berne convention and other treaties on copyright and related subjects. (Examination) (Fall—day and evening)

474 Trademark Law (2) Samuels
Procedural and substantive law on use, registration, and protection of trademarks, including the registration procedure in the U.S. and foreign offices. The law of domestic and foreign licensing and franchising arrangements relating to trademarks. Credit may not be earned for both Law 404 and 474. (Examination) (Fall—evening)

476 Patent Policy and Practice (2) Wegner
Patent practice issues, with emphasis on policy considerations. The course is taught from the perspective of electronics cases, including claim craftsmanship and consequences. (Examination)

478 Licensing of Intellectual Property Rights (2) Passeri, Sandercock
The legal context of licensing situations; rights and duties of parties to license; appropriate terms and conditions in contracts; antitrust and misuse constraints, including international considerations for Europe and Japan; and selected policy and practice considerations in international licensing. (Examination) (Fall—evening)

480 Chemical and Biotech Patent Law (2)
Public policy and practice considerations relating to patenting biotechnology and chemical inventions with in-depth treatment of unique practice areas. Open to LL.M. students. J.D. students may enroll only with the prior permission of the instructor. (Examination)

482 Patent Enforcement (2) Lever, Ferguson, Davis
Patent litigation for those who may wish to specialize in general litigation with occasional handling of patent cases, as well as for those interested in a patent solicitation career. Focuses on a rounded understanding of policy and practice considerations in the enforcement of patents. (Examination) (Spring—evening)

484 Computer Law (2) Stern
A copyright-side perspective on computer software and electronics issues. Attention to public policy and practice issues relating to software and semiconductor chips; patent vs. copyright vs. *sui generis* protection debate for software protection. Patent or copyright background is helpful but not required. Open to LL.M. students. J.D. students may enroll only with permission of the instructor. (Research paper) (Spring—evening)

485 Law in Cyberspace (2) C. Sloan, Goldstone
Survey of theoretical and practical aspects of legal issues concerning cyberspace, including First Amendment free speech rights, commerce, computer crime, privacy, political participation, and jurisdiction. Computer background is not a prerequisite. (Research paper)

486 Biotechnology Patent Policy (2)
Examination of biotechnology patent issues from a public policy standpoint, including ethical questions concerning patenting of life forms, the human

genome patenting controversy; international and comparative concerns, including release of micro-organism deposits to the public; and ownership of biotechnology and pharmaceutical interventions. Initial sessions will provide information necessary for students with neither a patent nor technical background; later sessions will focus on student research. (Research paper)

488 **Japanese Patent Policy** (2)
Consideration of a 1993 GAO report on Japanese intellectual property prepared for the U.S. Senate; allegations of unfair Japanese patent practices considered from various standpoints, including compliance with the Paris Convention and other treaties, as well as bilateral and multilateral reforms, including patent harmonization. (Research paper)

490 **International and Comparative Patent Law** (2) Adelman
A study of patent reform issues including domestic patent reform legislation and ongoing harmonization treaty discussions under WIPO; review of selected topics with comparative study from viewpoint of Japan, the United States, and Europe. (Research paper) (Spring—day)

494 **Intellectual Property Antitrust Seminar** (2) Zimmerman
Domestic and international concerns relating to antitrust and fair trade, with emphasis on U.S., European, and Japanese models. Consideration of basic intellectual property principles in patents, trademarks, and copyrights necessary for application of antitrust principles. Advanced understanding of antitrust law is a prerequisite unless waived by the instructor. Enrollment is limited. Prerequisite: Law 402 or permission of the instructor. (Research paper) (Spring—day)

496 **Intellectual Property Law Seminar** (2) Mossinghoff, Adelman, Oman
Selected topics in intellectual property law to be announced at the time of registration. Open to LL.M. students; J.D. students may enroll only with the prior permission of the instructor. (Research paper) (Fall and spring—evening; summer)

498 **Intellectual Property Issues—Short Seminar** (1)
This course is offered periodically in a concentrated series of seven two-hour lectures given over a period of approximately three to four weeks. The seminar is taught jointly by a leader in the field from Europe or Asia and a host professor from the Law School. Specific topics to be announced. (Research paper)

Government Contract Law

500 **Government Contracts** (3) Kovacic
Survey of the basic principles of government procurement, including the powers and limitations on government instrumentalities entering into contracts, the respective roles of the three branches of government in the process, the processes of contract formation and administration, the resolution of disputes arising out of both processes, and the various forums available for dispute resolution. Although the focus of this course is primarily on federal government procurement, there will be some consideration of state and local government contracting and may be some coverage of procurement by other nations or international organizations. This course covers some of the material covered in Law 502 and 503, but at an introductory level. Not open to students in the LL.M. program in government procurement law. (Examination and problem assignments) (Fall—day)

502 **Formation of Government Contracts** (4) Lees, Schooner
Survey of the law pertaining to government procurement, including an analysis of the unique features of government contracting and a discussion of the functions of Congress, the executive branch, and the courts in the procurement process. The course focuses on the contract formation process, including techniques for awarding contracts and litigation and protests involving awards. (Examination and problem assignments) (Fall—evening)

503 **Performance of Government Contracts** (4) Lees, Schooner
Discussion of the substantive problems that most frequently arise during the performance of government contracts. Interpretation of specifications and the most generally used contract clauses; analysis of the rights of the parties when performance in accordance with the terms of the contract is not obtained. Analysis of the methods that can be used by the parties to a government contract to

obtain legal relief, including detailed coverage of the disputes procedure, actions for breach of contract, and forms of equitable and extraordinary relief (Examination and problem assignments) (Spring—evening)

506 Government Contracts Cost and Pricing (2) Knight
Legal aspects of government contract accounting principles and allowability of costs. Cost accounting standards and cost allocation issues. Negotiation of cost, profit, and price. Disclosure of cost accounting data. (Problem assignments) (Spring—evening)

507 Government Contracts and Environmental Law Seminar (2) Lees, Hourclé
Focus on the wide range of environmental issues presented in the government contract formation and performance process, as well as the manner in which federal procurement law may be used to advance the goals of the environmental community and to implement environmental programs. Consideration of the nature and purpose of applicable environmental procurement statutes and regulations; selection of qualified environmental contractors; buying "green" products and services and contract types; sharing of responsibility for clean-up and remedial efforts and inherent problems at government and contractor facilities; applicable cost and pricing principles; and current developments and initiatives in the environmental law field. (Research paper) (Spring—day)

508 Comparative Public Procurement (2)
A comparative study of laws, regulations, and procedures dealing with public procurement, examination of special problems encountered in business dealings with sovereign states, analysis of contract formation, performance, and dispute resolution processes; consideration of influence of international organizations such as the European Union (EU), United Nations Commission on International Trade Law (UNCITRAL), General Agreement on Tariffs and Trade (GATT), financing institutions, and professional organizations; identification of differences between national and international procurement practices. Prerequisite or concurrent registration: Law 500, 502 or 520, or permission of instructor. (Problem assignments)

509 Government Contracts Seminar (2) Lees, Schooner
Selected topics in government procurement law to be announced at the time of registration. (Research paper) (Fall—evening; spring—day)

510 Graduate Government Contracts Placement (2, 3, or 4) Lees, Schwartz
Students work on a project in the government contracts field under the supervision of the faculty directors of the program and a lawyer practicing government contract law. The project may involve working with a government agency, a congressional committee, a private practitioner, or a nonprofit public-interest organization. Admission to the course is limited to LL.M. students and requires approval of one of the faculty directors of the program. This course is graded on a *CR/NC* basis. Five hours of work per week are required for each credit. (Fall and spring)

International Law

520 International Law (3 or 4) Buergenthal, Steinhardt, Murphy
Introductory survey of the legal system governing relations among states and its expansion to non-state actors, such as international organizations, natural and juridical individuals, indigenous groups, and proto-states. Analysis of the sources of international law, including the formation of customary norms and techniques of treaty interpretation, the application and enforcement of international law in domestic courts, international tribunals, organizations, and diplomacy; doctrines of jurisdiction and immunities; the impact of emerging states and new technologies on doctrine, the use of force, human rights, constitutional aspects of international law; and recurring political and jurisprudential issues. (Examination) (Fall—day and evening; spring—day)

522 International Business Transactions (3) Bhala, Murphy, Van Alstine
U.S. law and practice relating to characteristic forms of international transactions, including the transnational sale of goods (the law governing the documentary sale, various forms of letters of credit, commercial terms and insurance), the export of technology through franchising, distributorship, and

licensing contracts; and the export of capital through the establishment, operation, and withdrawal of foreign direct investment. The impact of relevant international organizations and/or emerging substantive international commercial law (e.g., the United Nations Convention on Contracts for the International Sale of Goods). Specialized problems in the negotiation and structure of international transactions. (Examination) (Fall—day and evening; spring—day)

524 International Commercial Law (2) Spanogle
The study of international transactions for the purchase, sale, payment for, and financing of goods, as governed by the U.N. Convention on Contracts for the International Sale of Goods and other multilateral treaties on international lease financing, factoring, commercial paper, and fund transfers. The substantive provisions of these treaties, the process by which they are developed, and the various interpretive approaches available under different legal regimes will be considered. Prerequisite: Law 522 or permission of the instructor. (Examination or research paper with permission of the instructor)

526 International Trade Law (2 or 3) Bhala
Study of domestic and international laws and institutions governing foreign trade. Legal aspects of U.S. participation in the World Trade Organization, NAFTA, and other international forums; laws regulating customs and tariffs, most-favored nation treatment, subsidies, dumping, unfair trade practices, and disruptive imports under the escape clause. Specialized problems in regulating exports under the Export Administration Act, boycotts, corrupt practices, and restrictive business practices may be covered. Prerequisite or concurrent registration: Law 522 or permission of instructor. (Examination) (Fall—day)

527 Advanced International Trade Law (3) Bhala
In-depth study of such topics as the operation and use of controversial trade remedies such as unilateral retaliation, intellectual property protection under GATT–WTO and NAFTA; the treatment of developing countries in the world trading system and programs such as the Generalized Systems of Preferences; the relationship between trade and labor; the relationship between trade and environmental protection; and trade liberalization in special sectors such as financial services, agriculture, and government procurement. Specialized problems involving emerging linkages between international trade and other fields, particularly philosophy and jurisprudence, international relations, development economics, human rights, and national security. Prerequisite: Law 526 or permission of the instructor. (Examination)

528 International Litigation (2) Charme
Study of the history, forms, progress, problems, and future of interstate, third-party dispute resolution. Examination of basic issues and principles of public international litigation and arbitration between governments and between a government and a private entity. Investigation of the guiding principles and essential elements of conducting litigation in the arena of public international law and with state parties through in-depth examination of leading cases before the International Court of Justice. Problems of mixed and interstate arbitration, both *ad hoc* and institutional. Prerequisite or concurrent registration: Law 520; for post-J.D. students, permission of instructor may be substituted. (Examination) (Spring—evening)

530 International Organizations (2 or 3) Crook
Analysis of characteristic legal issues arising out of the creation and operation of organizations of nation states. Included are issues of legal personality, treaty making and norm creation, privileges and immunities, membership, dispute settlement, and withdrawal. Exemplary problems in distinct institutional settings, including the United Nations, the International Labour Organization, the International Civil Aviation Organization, the Organization of Economic Cooperation and Development, the International Monetary Fund, and inter-American organizations. (Examination or research paper with permission of instructor) (Spring—evening)

532 Comparative Law (2 or 3) Cummins
Study of legal systems in the civil law tradition (France, Germany, Italy, Spain, Latin America, Japan). Comparison with the common law system. Consideration of the history and sources of the civil law, the major public and private law institutions in civil law countries, civil and criminal procedure, the role of civil

law lawyers (and of international lawyers working with them), and selected substantive legal issues. Several sessions are devoted to Islamic law as an example of a sophisticated non European system. (Examination) (Fall—day)

534 Law of the European Union (2) Schneebaum

Study of the legal nature and structure of the European Union. Topics include the roles of the Court and the other institutions, the question of sovereignty, the "four freedoms," competition, company law and labor relations, agriculture, the EU in international law, and the EU of the 21st century. (Examination) (Spring—evening)

536 Law of Japan (2) Grier

An introduction to the constitutional structure of Japan, including political institutions and the judicial system, the legal profession, corporate law, business organizations, commercial law, administrative regulation, taxation, dispute resolution, intellectual property, the Antimonopoly Act, and negotiating and drafting agreements. (Examination or research paper with permission of the instructor) (Fall—evening)

537 Traditional Jewish Civil Law (2) Lewin

Introduction to the methods, history, structure, and substance of traditional Jewish civil law. Using a section of the codified Jewish oral law known as Bava Basra, this course explores traditional Jewish civil law doctrine concerning topics such as property relationships between neighbors, mutual mistake and deception in sales contracts, inheritance, and topics relating to the law of evidence. In selected areas, the traditional Jewish civil law will be compared to the law of U.S. jurisdictions addressing similar issues. All materials for the course are in English and no familiarity with Hebrew or prior knowledge of Jewish law is required. (Take-home examination) (Fall—day)

538 Immigration Law I (2) Benitez

Theory and application of the Immigration and Nationality Act and 8 Code of Federal Regulations. Examination of practice before the Executive Office for Immigration Review, Immigration and Naturalization Service, Department of State, and Department of Labor. Removal, political asylum, adjustment of status, naturalization, and other issues. Enrollment is limited. (Examination) (Fall—day)

539 Immigration Law II (2) Lawrence

Focus on family- and employment-based immigration practice. Examination of the procedural aspects of obtaining lawful permanent resident status in the United States through the family and of employment preferences categories, as well as the process for obtaining non-immigrant admission. (Examination) (Spring—day)

540 Refugee and Asylum Law Seminar (2) Massimino

Selected topics from the areas of international law pertaining to the protection of refugees and domestic law of political asylum. Enrollment is limited. (Examination) (Spring—evening)

542 International Banking (2) Hassan

Study of the legal aspects of international banking and finance, including international laws and regulations concerning the structure and transactions of international banks and institutions. Topics include the institutional, legal, and regulatory framework for international commercial banking and development finance; the emerging rules regarding international trade in financial services; international supervision of banking activities and regulation of banking transactions; contractual instruments for international financial transactions, and international debt and development crisis. (Research paper) (Fall—evening)

544 Foreign Direct Investment (2) Cummins

An examination of the legal, business, and financial problems involved in investing across national borders. Focuses on the strategies and techniques for structuring such investments and on the framework of regulation that affects them. The analysis includes U.S. regulation of foreign investors, different types of foreign regulation of U.S. investments, and international controls on domestic regulation of foreign investment through treaties and conventions. Model international transactions and sample documents are used to illustrate basic issues. (Examination) (Spring—day)

546 International Law of Human Rights (3 or 4) Buergenthal
An overview of international and regional human rights instruments and institutions, focusing on the manner in which the United Nations, Inter-American, European, and African human rights systems seek to protect individual and group rights. Examination of the problems these systems have encountered in discharging their mandate and exploration of ways to strengthen international and regional governmental and nongovernmental efforts in the human rights field. Prerequisite or concurrent registration: Law 520; for post-J.D. students, permission of instructor may be substituted. (Examination) (Fall—day)

548 Air and Space Law (2) Schwetje
Study of the development of international law related to the use of air space and outer space; analysis of air and space treaties in force; the role of various intergovernmental and nongovernmental international organizations; consideration of special problems such as liability resulting from space activities, space technology and arms control, and pollution and contamination of outer space; earth resources, sensing, etc. Enrollment limited to 25 students. Prerequisite or concurrent registration: Law 520; for post-J.D. students, permission of instructor may be substituted. Credit may not be earned for both Law 548 and 551 (Research paper) (Spring—evening)

550 Law of the Sea (2) Oliver
International law related to the use of ocean space. Development of international law concerning internal waters, territorial sea, contiguous zone, high seas, continental shelf, fisheries, exclusive economic zone, maritime boundaries, marine environment, marine scientific research, deep seabed, and settlement of disputes. Current legal and policy issues associated with these areas. Prerequisite or concurrent registration: Law 520; for post-J.D. students, permission of instructor may be substituted. Credit may not be earned for both Law 550 and 551. (Examination) (Spring—evening)

551 International Law of Territory (2 or 3) P. Robinson
Study of the nature, importance, and implications of international law of territory. Analysis of basic international law principles relating to territory, including what territory is and what forms it can take, how it is acquired, how it is lost, how it is marked and divided, and how it is affected by history. Examination of classic international law cases concerning territorial disputes, and discussion of the importance of the concept of territory in the development of public international law generally. Exploration of future implications, including those of territorial change on self-determination and human rights, and study of current and future "hot spots." Students who earn credit for Law 551 may not earn credit for either Law 548 or 550. (Examination) (Fall—evening)

552 Law of War (2) Carnahan
Human rights law in international and internal armed conflict, examining the origins of the law of war, the 1949 Geneva Conventions for the Protection of War Victims, the Geneva Protocols of 1977, the 1980 Geneva Conventional Weapons Convention, other treaties and customary international law relating to means and methods of warfare, the role of the International Committee of the Red Cross, war crimes and enforcement mechanisms, and current problems in the regulation of hostilities. Prerequisite: Law 520. (Research paper) (Spring—day)

553 International Law, Ethics, and Conflict (2)
Introduction to norms of international law and major Western moral traditions that govern conflict among and within states. Topics include the U.N. framework for the peaceful settlement of disputes, collective security, and peacekeeping; individual and collective self-defense, intervention on behalf of self-determination and human rights, arms control and disarmament, and the laws governing the conduct of war and the means of enforcing these laws. Topics are discussed with special attention to their application in recent conflicts (Examination)

554 International Criminal Law (2) Witten, Harris
Study of selected issues attending the application of criminal law across international boundaries. Topics may include war crimes, terrorism, narcotics trafficking, money laundering, business fraud, extradition, and the recognition of foreign penal judgments. Prior enrollment in Law 360 and 520 is recommended (Examination or research paper with permission of the instructor) (Spring—evening)

556 International Arbitration (2) Ristau
Survey of arbitration and related mechanisms of dispute resolution in the international legal system that arise out of commercial, financial, and governmental transactions. Analysis of the arbitration agreement, the process of arbitration, and the enforcement of arbitral awards as well as the common principles governing the disposition of claims. Review of the various arbitral tribunals and their rules. Prerequisite or concurrent registration: Law 520 or 522, for post-J.D. students, permission of instructor may be substituted. (Examination) (Spring—evening)

558 International Negotiations (2) Campbell
The art and science of international negotiations from a practitioner's perspective, analysis of the roles of the legislative and executive branches; examination of the inter- and intra-agency processes, including pre-, during, and post-negotiation; impact of external influences; U.S. approach toward negotiation of NAFTA and the World Trade Organization; arms control negotiations, with a case study of the Philippines Base Negotiations. Practical exercises in negotiations. Prerequisite or concurrent registration: Law 520 or 522, for post-J.D. students, permission of instructor may be substituted. (Research paper) (Fall—evening)

562 Public International Law Seminar (2) Steinhardt
Selected topics in the theory and practice of international law to be announced at the time of registration. Enrollment is limited. May be repeated for credit if topic differs. Prerequisite: Law 520 or permission of instructor. (Research paper) (Spring—day)

564 International Business Transactions Seminar (2) Alexandrov
Selected topics in international business law and practice to be announced at the time of registration. Enrollment is limited. Prerequisite: Law 522 or permission of instructor. (Research paper) (Spring—evening)

565 Comparative Law Seminar (2 or 3) Cummins
Selected topics in comparative law to be announced at the time of registration. Enrollment is limited. (Research paper)

568 Human Rights Lawyering (2 or 3) Steinhardt
Examination and assessment of the role of lawyers in the articulation and implementation of international human rights law. Topics include theories and methods of investigation and fact-finding, interpretation and application of law, choice of remedies and strategies for case development, and the nature of human rights law practice on behalf of governments, intergovernment organizations, and nongovernmental organizations. Students participate in role plays and work on cases and applied projects submitted by the United Nations and inter-American and other intergovernment organizations, and by international nongovernmental organizations. (Examination or research paper)

Oxford–GW International Human Rights Law Program

The courses in this section are available primarily through the Law School's summer program on human rights law, offered in conjunction with the University of Oxford and held on its campus. Selected courses may also be offered at the Law School. In addition to the courses listed below, the Oxford–GW program curriculum offers Law 546, *International Law of Human Rights*, as *Fundamentals of International Human Rights Law* and Law 568, *Human Rights Lawyering*.

570 The New Due Process (2) Hoffman
Examination of the increasingly articulate body of international human rights law addressing the rights of individuals to equitable treatment at the hands of the state, including international standards regarding detention, arrest, bail, search and seizure, punishment, and a range of fair trial rights, such as the right to counsel, the presumption of innocence, and standards of evidence. Special topics include the rights of defendants and the rules of evidence in international tribunals, such as the Yugoslavian War Crimes Tribunal, as well as the impact of international norms in domestic criminal cases. (Examination)

572 Comparative Human Rights Institutions (2)
Examination of the distinctive features of the institutional arrangements for the protection of human rights in the United States and other countries and regions

Emphasis on developments in the European Union, the Organization for Cooperation and Security in Europe, and inter-American and African systems. Topics to be covered include the availability of regional courts for hearing individual cases, documenting human rights violations, and monitoring elections and human rights performance. (Examination)

574 **Human Rights and Refugee Law** (2) Shacknove
Examination of the protection of refugees, asylum seekers, and the internally displaced under the UN Refugee Convention and other international instruments, regional accords, and national law. Emphasis is placed on considering the various conceptions of "refugee," defining persecution, and understanding the rights of asylum and nonexpulsion. Regional developments in Europe, Southeast Asia, and Africa are covered. The predicament of populations at risk, especially women and victims of war or conflict, is discussed. The consequences for the human rights of forced migrants of humanitarian intervention, safe havens, and economic sanctions are analyzed. (Examination and class participation)

576 **International Rights of Women** (2) Goldstein, Coomaraswamy
Examination of the international legal regime for the guarantee of women's rights and why it has been inadequate for the protection of women. Topics include the evolution of the conventions of the rights and protection of women; gender-specific violence as a violation of human rights; cultural variation and the treatment of women and development; and the risks faced by women refugees. Consideration is given to the relationship between feminist theory and human rights law. (Examination) (Fall—evening)

578 **Human Rights Advocacy and Dissemination** (2) Méndez
This course offers students the opportunity to develop skills in human rights advocacy and dissemination. Through the use of simulation exercises, such as the preparation of petitions to regional and international human rights bodies, country condition reports in support of litigation in national courts, and applications for refugee status, students engage in critical analysis of the methods and strategies for human rights advocacy at the local, national, regional, and international levels. Emphasis is also placed on the training of officials in human rights standards and the dissemination of such information to the general public. Students who receive credit for Law 570 may not enroll in this course. (Simulation exercises and class participation)

580 **Individual and Group Rights** (2) Thornberry
Study of the legal instruments that protect the rights of individuals and groups and the jurisprudential bases of those instruments. Emphasis on the legal issues that arise under treaties and customary international law as ethnicity comes to play an important role in post–Cold-War politics and the workings of international organizations. The differing jurisprudential approaches of natural law, liberal individualism, and communitarianism to the rights of persons and groups—especially minorities and indigenous peoples. Attention will be given to the question of whether modern representative democracies are capable of protecting minorities and cultural variation. (Examination)

582 **Humanitarian Law and Populations at Risk** (2)
Study of the evolution of the laws of war from the seventeenth century through the Geneva Conventions and the war crimes jurisprudence of the late twentieth century, with primary emphasis on populations at risk in times of war, including civilians and prisoners of war. Examination of the application of customary and conventional law principles to current conflicts, e.g., the former Yugoslavia, Somalia, and Iraq. Emphasis on the extent to which humanitarian law constrains the actions of international actors, including the United Nations, NATO, and the European Union, in their various peace-keeping functions. (Examination)

Law and Other Disciplines

590 **Jurisprudence** (2 or 3) Mitchell
Basic jurisprudential concepts; nature of law; development of legal institutions. Jurisprudential schools—natural law, analytical, historical, sociological, functional; law and logic; law and justice; the judicial process; legislative, executive, administrative decision making; impact of politics, economics, and scientific

advance on legal systems; contemporary trends in jurisprudential thought. (Examination) (Fall—day)

591 Survey of U.S. Legal History (2 or 3) Cottrol
Examination of the history of U.S. law from the seventeenth century to the present. Topics include Anglo-American constitutionalism; the reception and transformation of the common law; slavery and the law; race and gender in U.S. law; corporations, labor and the rise of the regulatory state; and legal education and the legal profession in U.S. history. (Research paper) (Spring—day)

592 Jurisprudence Seminar (2 or 3) Galston
Selected topics in legal theory to be announced at the time of registration. Enrollment is limited. (Research paper or examination) (Fall—day)

593 Professional Responsibility and Ethics Seminar (2)
Selected topics in professional responsibility and ethics. Intensive study of questions of lawyer responsibility and ethics raised by professional codes and moral philosophy. Prerequisite: Law 218. Enrollment is limited. (Research paper)

594 History of the U.S. Constitution (2 or 3) Wilmarth
Philosophical and historical roots of the U.S. Constitution, with consideration of the writings of Locke, Hobbes, and Montesquieu; the natural law and social contract theories; and the application of these concepts in the debates surrounding the drafting and ratification of the Constitution. The degree to which these concepts have been reflected in decisions of the Supreme Court, with primary focus on the Marshall Court but consideration also of more recent decisions. (Examination or research paper with permission of the instructor)

595 Race, Racism, and American Law (3) Butler
Examination of the influence of race and racism on the development of law in the United States. The use of law by legislatures and judges, both to enforce and to remedy racism in selected contexts, possibly including criminal justice, voting rights, public accommodations, education, employment, housing, free speech, and family law. The course will also consider the utility of critical race theory as a method of legal analysis. (Examination) (Fall—day)

596 Law and Social and Economic History Seminar (2 or 3) Cottrol
The interrelationship between law and social and economic development in U.S. history. Topics vary and will be announced at the time of registration. (Research paper) (Fall and spring—evening)

597 Legal History Seminar (2 or 3) Lettow, Hamburger
Selected topics in legal history to be announced at the time of registration. Enrollment is limited. (Research paper) (Fall and spring—day)

598 Law and Economics (2 or 3)
An introduction to the main features of the "Law and Economics" movement, with particular attention to the content, application, and criticisms of the Coase theorem. Topics include a brief review of essential aspects of price theory (including the concept of a competitive price equilibrium), an introduction to the principal notions of welfare optimality (including Pareto and Hicks–Kaldor efficiency), and the problems posed by externalities and public goods. Emphasis on some of the classical works in this field and applications to specific decisions. Prior enrollment in Law 604 is recommended for students with no previous exposure to economics. (Problem sets and/or take-home examination)

600 Public Economic Policy and the Law (2) D. Peterson
Interrelation of law and economics in such subject-matter categories and decisional contexts as economic regulation of industry, fiscal policy planning, government research and development practices, foreign trade and investment, and public spending priorities. (Research paper) (Spring—evening)

602 Law and Accounting (2 or 3)
Study of fundamental accounting principles with emphasis on corporation accounting, legal and accounting implications of specific items in financial statements of corporations, inventory adjustments, corporate transactions, distributions, capital adjustments. Strongly recommended for students who have had no accounting. (Examination and problem assignments)

604 Quantitative Analysis for Lawyers (2 or 3)
Introductory course for lawyers that does not assume or require advanced mathematical skills. Application of non-legal methods of analysis in public policy

problems with attendant evidentiary requirements, including the effective use of experts. Principal non-legal methods of policy analysis, including micro-economic analysis (basic price theory and industrial organization), financial analysis (including the roles of financial institutions), and statistical analysis. Introduction to basic analytic concepts and terminology/jargon, common applications of the analysis in the law, and practical problems of expert witnesses. Topic coverage and emphasis will vary with the instructor; see special posting for the current semester.

606 **Law and Literature** (2) Schaller
The law in literature and the law as literature. Themes include revenge and retribution, interpreting intent, and modern social currents. Readings are selected from Aeschylus, Chaucer, Shakespeare, Dickens, Melville, Twain, Galsworthy, Kafka, and others. (Oral presentation and writing assignments.) (Fall—evening)

608 **Feminist Legal Theory** (2) Ridder
Law and society studied from the point of view of women. The course focuses on feminist jurisprudential treatment of gender and examines the prospects for sex equality under the law. Enrollment is limited. (Research paper) (Spring—day)

614 **Law and Psychiatry** (2) Chambers, Lewis
Designed to expose the lawyer to basic constructs of psychiatry and psychology and to explore their implications in legal rules and practice. Psychiatrists and psychologists actively involved in teaching process. Topics include psychological testing and other assessment techniques, psychiatric evaluations and reports, competency in civil and criminal contexts, criminal law matters (including criminal responsibility and dispositional issues), civil commitment, informed consent, and guardianship. Commercial and educational movies are utilized to illustrate psychiatric constructs and the workings of a particular mind. Emphasis is given to the more easily observable mental conditions of dementia, depression, and delirium in order to illustrate psychiatric diagnosis. There is ordinarily at least one session in a mental institution. (Examination)

615 **Law and Psychology** (2) Klionsky
Study of the interaction between psychology and law. Issues include eyewitness identification, hypnotically induced testimony, polygraphs and lie detection in general, jury selection, jury decision making (including the effects of jury size and unanimity requirements), death qualified juries, foreseeability, procedural justice, predicting dangerousness, judgments of responsibility, and battered woman syndrome. (Research paper)

617 **Law and Medicine** (2 or 3) Rosenbaum
Defining and regulating the quality of health care; the tort liability of medical professionals and institutions; confidentiality, disclosure, and informed consent; tort reform; managed care and theories of tort liability; personhood, reproduction, human experimentation, and patients' rights; death, dying, advanced technology, and the limits of intervention; hard choices and public policy. (Examination or writing assignments) (Spring—day)

Clinics and Outside Placement

620 **Consumer Mediation Clinic** (2 or 3) Izumi
Open to second- and third-year students (first-year students may participate during the summer of their first year). Students act as neutral third parties who help consumers and businesses resolve disputes by negotiating mutually agreeable settlements. Students perform case intake, provide information and referrals, and mediate assigned cases involving a variety of consumer issues (debt collection, credit problems, defective goods and services, home improvement contracts, etc.). Students develop problem-solving techniques as they apply local and federal consumer laws. Students must complete four hours of clinic work per week for each credit earned (includes mandatory seminar) and must present a brief paper analyzing one of their cases. Students work under the guidance of a supervising attorney with the help of more experienced student directors who also provide administrative support. Permission of the instructor required prior to registration. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Students may enroll concurrently in

this course and Law 633 only with permission of both instructors. (Fall and spring)

621 **Small Business Clinic** (2, 3, or 4) Jones

Under the supervision of the instructor, students assist small businesses and nonprofit organizations with a wide variety of legal issues, including drafting incorporation and partnership papers (such as articles of incorporation and bylaws), compliance with local licensing requirements, reviewing and drafting contracts and leases, advising on tax problems and related matters. 15–20 hours of work per week required. Prerequisite: Law 250 and 300 and permission of instructor. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall and spring)

624 **Civil Litigation Clinic** (4) Strand

Open to third-year students. Participants represent indigent litigants in D.C. Superior Court. Students are exposed to a range of cases in the Family Division (divorce, custody, child support, alimony) and the Civil Division (small claims, negligence, consumer, property disputes). Responsibilities include client interviewing, investigation, settlement negotiations, drafting of initial pleadings and motions, as well as conducting actual hearings and trials. Students must have 16 to 20 hours per week to devote to this clinic. Must be taken for the full academic year. 8 graded credits are awarded at the end of the spring semester. Participation is by permission of the instructor; applications must be submitted during the spring of the preceding academic year. Prerequisite: Law 230 and 300. Law 640 is strongly recommended. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall and spring)

625 **Federal, Criminal, and Appellate Clinic** (4) Lyman

Under supervision of the instructor, third-year students litigate appellate cases, primarily direct appeals from criminal convictions in area courts of appeal. Student responsibilities include development of the lawyer-client relationship, record review and selection of issues, briefing, and oral argument. A weekly seminar addresses the lawyer's role, ethical and procedural problems, litigation strategy, and criminal justice issues through role-playing, simulation, and written exercises. Student work loads fluctuate, but average about 20 hours per week. Enrollment is by permission of the instructor, and applications must be submitted during the spring of the preceding academic year. Must be taken for the full academic year. 8 graded credits are awarded at the end of the spring semester. Prerequisite: Law 230 and 300. Law 650 is recommended. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall and spring)

626 **Vaccine Injury Clinic** (4) Meyers

This clinic allows approximately ten second- and third-year students, under faculty supervision, to represent individuals who have suffered serious vaccine-related injuries and who are seeking damages in trial and appellate proceedings before the U.S. Court of Federal Claims. A weekly two-hour seminar will focus on multidisciplinary (medical/legal) training in vaccine injury issues, and on lawyering skills such as client interviewing and counseling and cross examination of medical experts. Students will also evaluate Claims Court's program as a model for tort reform. Students must devote approximately 16 hours per week to the clinic, and participate in both the fall and spring semesters. Four hours of graded credit are given for each semester. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall and spring)

627 **Environmental Law Clinic** (2 or 3) Turley

Second-, third-, and fourth-year students participate in the J.B. and Maurice C. Shapiro Environmental Law Clinic, representing clients in environmental litigation in both the federal and state systems. Students work under faculty supervision in administrative, trial, or appellate actions, particularly citizen suit actions. This work includes actions under the Clean Air Act, the Clean Water Act, the Comprehensive Environmental Response, Compensation and Liability Act, the Endangered Species Act, the Resource Recovery and Conservation Act, and the Federal Facilities Compliance Act. Permission of the instructor is required prior to registration. Two or 3 hours of graded credit are given for this

course. Prerequisite or concurrent registration: Law 430. Students may enroll concurrently in this course and Law 633 only with permission of both instructors (Fall and spring)

628 **Domestic Violence Clinic** (4) Meier, Dutton
Students in this clinic represent victims of domestic violence, seeking protection orders or their enforcement in D.C. Superior Court. Students gain extensive experience interviewing and counseling clients and usually participate in at least one trial in the course of the year. Students also participate in community projects, through which they learn about the social context of law and the difference between legal theory and practice, while developing a broader vision of their role as lawyers. An interdisciplinary approach to understanding domestic violence and working with clients is emphasized, with a clinical psychologist consulting on cases and participating in the seminar. The required two-hour seminar focuses on the law and psychology of domestic violence and development of lawyering skills. Students should plan to devote 16 to 20 hours per week to this course. Open to third-year students with permission of the instructor. Ordinarily, must be taken for the full academic year; 8 graded credits are awarded at the end of the spring semester. Prerequisite: Law 230 and 360; Law 640 is recommended. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall and spring)

630 **Immigration Clinic** (3) Benítez
Aliens subject to removal orders in immigration court are represented by second- and third-year students. Students determine what forms of relief from removal, if any, are available to their clients, such as political asylum/withholding of deportation, and cancellation of removal. Under faculty supervision, students represent their clients in immigration court, in administrative appeals to the Board of Immigration Appeals, and at judicial review in federal court. Students are expected to assume substantial responsibility and initiative in representing their clients. Approximately 15 hours of casework per week is usual although that may increase or decrease depending on the caseload. A two-hour weekly seminar is required. Because the clients are from all over the world, cultural sensitivity is essential; foreign language skills are welcome but not required. Permission of the instructor is required prior to registration. Prerequisite: Law 538. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall and spring)

631 **Health Law Rights Clinic** (2) Andersen
Under faculty supervision, second- and third-year students provide advice and information and assist in providing legal representation to older D.C. residents who are having difficulty with medical bills, Medicare, Medicaid, and other health insurance problems. Students perform two hours of intake at the office or by home visit each week, attend the weekly two-hour health insurance seminar, and take major responsibility for up to five cases during the semester. Areas of legal representation include Medicaid, "Medigap" insurance, HMO or managed care coverage under Medicare, appeals regarding denial of payment for hospital or home health care before the utilization review organization or an appropriate judicial forum; negotiating with collection agencies and billing offices regarding payment of medical bills. Student should expect to devote 10 hours per week to this course. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall and spring)

632 **Administrative Advocacy Clinic** (2) Gutman, Cunningham
Under faculty supervision, second- and third-year students represent low-income and elderly clients before federal and D.C. administrative agencies and, on occasion, in court. Students have primary responsibility for interviewing and counseling clients and using oral and written advocacy skills to advance claims informally and in administrative hearings. Students work in the areas of Social Security, disability, food stamps, AFDC, and other public entitlement programs. Students also draft wills, powers of attorney, and other legal documents. Participants in the clinic are expected to work eight hours per week and attend a two-hour weekly seminar. Because of federal conflict of interest rules, students gen-

erally may not participate in the clinic while employed, with or without pay, by the federal government. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall, spring, summer)

633 **Outside Placement** (1, 2, 3, or 4) Fitzgerald

Students arrange independent projects with state or federal public-interest organizations for academic credit. A compilation of suggested projects is available at the Community Legal Clinics office. Projects must receive prior approval by the instructor. Students who wish to work with the bankruptcy division of *Law Students in Court* for 2 or 3 credits should register for this course. Students who wish to participate for the full academic year for a total of 8 credits in the Howard University School of Law Criminal Justice Clinic or in the Federal Public Defenders Program should register for this course. Students may enroll concurrently in this course and any other clinical course only with permission of both instructors. This course is graded on a *CR/NC* basis. Students may earn no more than a total of 8 credit hours in this course. (Fall, spring, summer)

634 **Law Students in Court** (4) Hay

A clinical program in trial advocacy, offering an opportunity to develop skills as a trial lawyer while representing indigent persons in the Superior Court of the District of Columbia. Students may participate in either the civil division (which focuses primarily upon the representation of tenants in landlord–tenant actions, but also handles some consumer, negligence, and other civil matters) or the criminal division (in which student litigators defend persons charged with misdemeanor offenses). Students in both divisions have the opportunity to participate in jury trials. They are responsible for all aspects of litigation under the supervision of clinical instructors: interviewing clients and witnesses, conducting investigations, preparing pleadings, engaging in settlement negotiations or plea bargaining, and conducting all motions hearings and trials pursuant to the Superior Court's third-year practice rule. Only third-year students who have completed Law 210, 212, 213, 230, and 360 may participate in the clinic. Seminars are held in the civil division on Monday evenings and in the criminal division on Wednesday evenings. Students must have one day per week available for court appearances and plan to devote approximately 20 hours per week to the clinic. Students must participate in the program for two consecutive semesters, beginning in either the summer or fall. Application must be made during the spring semester of the preceding academic year. This course may not be taken at the same time as Law 624 or any litigating activities in Law 632. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. Enrollment is limited, with selection by lottery. This course is graded on a *CR/NC* basis. For the bankruptcy division of *Law Students in Court*, see Law 633, *Outside Placement*. (Fall, spring, summer)

635 **Disabled People and the Law** (2) Banzhaf

Examination of those areas in which persons with disabilities have traditionally been denied some right or benefit afforded other persons in our society and have resorted to legal action, introduction to statutes and agencies designed to protect people with disabilities. Students may choose to prepare a research paper (and receive legal writing credit and a numerical grade) or to gain practical experience doing a clinical project (on a *CR/NC* basis). Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Spring—day)

636 **Law and the Deaf** (1, 2, or 3) Banzhaf

Work with the National Association for the Deaf in bringing legal information, services, and representation to the more than 13 million Americans who are deaf or hearing-impaired. The Association is designed to help make the hearing-impaired aware of their legal rights and to assist them in solving their legal and law-related problems. Students may participate in one or more projects: (1) counseling persons with hearing impairments about legal problems at a walk-in clinic usually held on the Gallaudet College campus, (2) preparing and participating in workshops for hearing-impaired persons to acquaint them with their rights and obligations under the law, (3) assisting in representing the interests of deaf and hearing-impaired persons in judicial and administrative pro-

ceedings; (4) preparing research papers on topics related to law and the deaf or preparing handbooks explaining legal topics to the hearing-impaired. Students may learn some sign language but will be assisted by trained translators when dealing with deaf individuals. Approximately 60 hours of work per semester is required for each credit hour. Students may repeat this course for a maximum of 8 credit hours of credit. This course may not be taken at the same time as Law 634 or any litigating activities in Law 632. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. This course is graded on a *CR/NC* basis. (Spring)

637 **Legal Activism** (2 or 3) Banzhaf
Study of the legal process, not to benefit individual clients, but as a powerful tool for affecting social change and advancing the public interest. Topics discussed in a two-hour seminar meeting each week include principles of maximizing legal leverage, legal judo, guerrilla law, working with the press and members of Congress, drafting of legal documents, unusual legal tools and tactics, negotiation, making money from public interest law, etc. Students may choose to bring a public interest legal action before an agency or in court or may undertake another legal action project for 3 credits and receive a numerical grade. Alternatively, students may do research on a topic related to public interest law for 2 credits on a *CR/NC* basis. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall—day)

638 **Intensive Clinical Placement** (arr.) Staff
Projects involving litigation, research, or public interest activities of a legal nature (including aid to indigents, support of public interest nonprofit corporations, and support of governmental agencies or courts) may be initiated and will be supervised by a faculty member. Projects must be approved in advance by the Law School Supervisory Committee (three members) both as to whether the project is appropriate and as to the number of credit hours to be granted. A maximum of 10 credit hours may be taken in one or two semesters. This course is open to a limited number of third-year students. This course is graded on a *CR/NC* basis. Students may enroll concurrently in this course and Law 633 only with permission of both instructors. (Fall, spring, summer)

Skills and Simulation Courses

640 **Trial Advocacy** (3) Saltzburg, Levie, Gilligan, Horn, Gierke, Kennedy, Andewelt, Urbina, Johnson
Pretrial and trial techniques with emphasis on procedural, evidentiary, tactical, and ethical problems experienced by trial lawyers in actual cases. Complaint drafting, pretrial motions, depositions and other discovery methods, preparation of witnesses, jury selection, the use of experts, direct and cross-examination, introduction of documents, courtroom techniques, and opening and closing arguments. Role playing in simulated courtroom situations. Once registered, no student may drop this course without the express permission of the dean. Prerequisite: Law 230; Saltzburg—students may be enrolled concurrently in Law 230. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Enrollment is limited. (Short papers and exercises) (Fall—day and evening; spring—evening, summer)

642 **Federal Trial Practice** (2) Jackson
Presentation of cases focusing on the critical procedural stages of litigation in federal court. Pretrial motions and discovery, including depositions of lay and expert witnesses, witness examination, introduction of evidence, courtroom techniques, and oral argument, are covered using pleadings from actual cases tried in federal court. Prerequisite: Law 212; prerequisite or concurrent registration: Law 230. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. Enrollment is limited. (Fall and spring—evening)

643 **Pre-Trial Advocacy** (2 or 3) A. Robinson
Pre-trial and trial techniques of civil discovery and motions practice by role-playing in simulated cases. The class is divided into "law firms" that represent clients in cases at the pre-trial stage. Students are required to attend pre-trial conferences and conduct extensive discovery, including conduct of depositions, argument on discovery motions to compel or sanctions, preparation and service of interrogatories, requests for production, requests for admissions, and

motions for physical and mental examinations. The course ends with a five-hour mock trial by jury. (Simulation and paper) (Fall—day and evening, spring—day)

644 Moot Court (1 or 2)

The Moot Court Board sponsors four upper level intrascholastic competitions each year. The Van Vleck Constitutional Law Moot Court Competition consists of a preliminary round for which students earn 1 credit and quarter-final, semi-final, and final rounds; those students who advance beyond the preliminary round earn 1 additional credit. All participants in the Jessup International Law Moot Court Competition earn 1 credit; the top four finalists of the in house Jessup Competition earn a second credit and represent the Law School at the Jessup Regionals, earning a third credit for this interscholastic round. All participants in the Giles S. Rich Intellectual Property Law Moot Court Competition earn 1 credit; the top two finalists of the in house Giles Rich Competition earn a second credit and represent the Law School at the Giles Rich Regionals, earning a third credit for this interscholastic round. All participants in the Government Contracts Moot Court Competition earn 1 credit; those students who advance beyond the preliminary round earn 1 additional credit. In no event may a student receive more than a total of 3 credits for intra- and interscholastic competitions under Law 644 and or Law 654. Once registered, no student may drop this course without permission of the dean. This course is graded on a *CR/NC* basis. (Fall and spring)

646 Mediation (2) Izumi, Ray, Ostermeyer

Consideration of the growing use of mediation to resolve disputes and comparison with other dispute resolution processes. Taking the roles of mediators and disputants; students participate in a number of simulations. Mock mediations are conducted individually and with a co-mediator. Examination of practical and ethical issues; applicability to various substantive areas including contract, tort, consumer, family, criminal, discrimination, and landlord-tenant. Students are expected to fill out role-playing evaluations of themselves and classmates on a regular basis and to write a 15-page paper (which does not count toward fulfilling the legal writing requirement) discussing a particular application of mediation or other dispute resolution process or an ethical or legal question involving mediation. Class attendance is mandatory. Enrollment is limited. Students may take both Law 646 and 647 from the same instructor only with the instructor's permission. (Fall—day)

647 Alternative Dispute Resolution (2 or 3) Hoffman

Theoretical and practical aspects of negotiating and mediating transactions and disputes. Techniques studied include neutral evaluation, regulatory negotiations, mini-trials, settlement judge approaches, arbitration, and other "hybrids." Students participate in a number of simulated disputes related to various practice areas, both in and outside of class. Enrollment is limited. Students may take Law 647 and either 646 or 648 from the same instructor only with the instructor's permission. (Role playing and written assignments.) (Spring—evening)

648 Negotiations (2 or 3) Craver, Ray, Hoffman

Examination of the negotiation process employed by legal practitioners. The assigned text considers the negotiation process, negotiating techniques, verbal and nonverbal communication, and other factors that influence these interpersonal transactions. Students engage in negotiation exercises that enable them to practice the art of negotiating and to examine their personal strengths and weaknesses. Grades are determined in meaningful part by the results obtained, vis-a-vis other class members, from these exercises. Students are also required to prepare a short paper on a topic pertaining to the negotiation process. Enrollment is limited. Students may take both Law 648 and 647 from the same instructor only with the instructor's permission. (Fall—day and evening, spring—day; summer)

650 Client Interviewing and Counseling (2) Dean

Practice with gathering and evaluating facts supplied by clients, followed by presentations of advice based on consideration of facts and applicable law. Discussion of interpersonal aspects of client relations and ethical problems that may arise in the context of client interviews. Students participate in simulated interviews, portraying both clients and attorneys. A paper discussing some

aspect of the interviewing and counseling process is required. Enrollment is limited. (Simulation and paper) (Fall and spring—evening)

652 **Advanced Oral Advocacy** (2)
Focus on persuasive use of language and oral communication skills in litigation and nonlitigation contexts. Study of historical and modern rhetoric, effective use of language, legal and other authority, facts, and speaking techniques. Students research, write, perform, and receive feedback on oral presentations in appellate, trial, legislative, and expository settings. Enrollment is limited. (Writing assignments and oral presentations)

654 **Trial Court Competition** (1 or 2)
The Trial Court Board sponsors an intrascholastic competition in the fall semester. The competition offers students an opportunity to practice trial skills and serves as a basis for selection of teams to represent the Law School at various interscholastic trial competitions. The competition requires a two-person team to prepare a written trial brief and argue its case before a judge and jury. The competition also provides a seminar on trial advocacy skills, strategies, and techniques. Students who participate in the fall competition receive 1 academic credit. Those students attending interscholastic trial competitions in the spring semester receive 2 additional credits. Under no circumstances may a student receive more than a total of 3 hours of credit for intra- and interscholastic competitions under Law 654 and/or Law 644. Once registered, no student may drop this course without permission of the dean. This course is graded on a *CR/NC* basis. (Fall and spring)

656 **Independent Legal Writing** (1 or 2) Staff
Preparation of a research paper under the supervision of a full-time member of the faculty who will determine, prior to registration, whether the work required for the topic selected justifies 1 or 2 credit hours of credit. If elected for 1 hour of credit, this course may be repeated to meet the legal writing requirement for the degree. Approval of the faculty member is required prior to registration. See recommended guidelines under Academic Regulations. Research Papers. (Research paper) (Fall, spring, summer—as arranged)

658 **Law Review** (1, 2, 3, or 4) Clark
Limited to members of the student staff of the *Law Review*. A maximum of 4 credit hours may be earned in this course. This course is graded on a *CR/NC* basis. (Fall and spring—as arranged)

659 **Journal of International Law and Economics** (1, 2, 3, or 4) Steinhardt
Limited to members of the student staff of the *Journal of International Law and Economics*. A maximum of 4 credit hours may be earned in this course. This course is graded on a *CR/NC* basis. (Fall and spring—as arranged)

660 **The Environmental Lawyer** (1, 2, 3, or 4) Reitze
Limited to members of the student staff of *The Environmental Lawyer*. A maximum of 4 credit hours may be earned in this course. LL.M. students are eligible for membership but may not receive academic credit for the course. This course is graded on a *CR/NC* basis. (Fall and spring—as arranged)

661 **Public Contract Law Journal** (1, 2, 3, or 4) Lees J. Schwartz
Limited to the members of the student staff of the *Public Contract Law Journal*. J.D. candidates may earn a maximum of 4 credit hours and LL.M. candidates may earn a maximum of 2 credit hours in this course. This course is graded on a *CR/NC* basis. (Fall and spring—as arranged)

662 **Intellectual Property Law Journal** (1, 2, 3, or 4) Schaffner
Limited to members of the student staff of *The American Intellectual Property Law Association Quarterly Journal*. A maximum of 4 credit hours may be earned in this course. This course is graded on a *CR/NC* basis. (Fall and spring—as arranged)

666 **Research and Writing Fellow** (2) Sloan
Limited to students selected to assist in teaching first-year *Legal Research and Writing* (Law 216) and *Introduction to Advocacy* (Law 217). Two credit hours may be earned in both the fall and spring semesters. This course is graded on a *CR/NC* basis. (Fall and spring—day and evening)

667 **Research and Writing Fellow—International** (3) Steinhardt
Limited to students selected to assist in teaching the legal research and writing component of Law 694, *Fundamental Issues in U.S. Law*. This course is graded on a *CR/NC* basis.

Graduate Courses in Litigation and Dispute Resolution

675 Advanced Trial Advocacy (3) Levie
Students learn to conduct a civil, criminal, or administrative trial before a jury or judge in a professional and effective manner. By engaging in simulated courtroom situations followed by specific critiques and recommendations for improvement, students learn to present persuasive opening statements and closing arguments, to conduct forceful direct and cross-examination of fact witnesses and experts, and to introduce successfully all types of exhibits. By reference to examples, students also become familiar with the ethical, evidentiary, procedural, and substantive aspects of litigation. The course will emphasize practical solutions to typical problems litigators encounter in the presentation of a case. At the conclusion of the course, students will undertake the trial of a simulated case from opening statement through jury deliberation before a judge or very experienced litigator. Enrollment is limited. Open to LL.M. students. (Simulation) (Spring—evening)

676 Mediation and Alternative Dispute Resolution (3) Stanley, Kant
An introduction to alternative dispute resolution, with a focus on the many ways in which ADR can be used effectively by the advocate. Issues include determining whether ADR is appropriate in a given case, the timing of an ADR process, and the type of process that should be used. The role of the advocate during a mediation or other dispute resolution process, e.g., the selection of the neutral, preparing for a mediation, and the advocate's participation in the mediation itself. Emphasis on the mediation of civil cases, with a briefer discussion of the use of ADR in the criminal justice context. Enrollment is limited. Open to LL.M. students. (Simulation) (Spring—evening)

677 Pre-Trial Practice in Civil Cases (3) A. Robinson
Students in this simulation course are divided into law firms and assigned roles that correspond to the pre-trial tasks lawyers routinely are called upon to perform in civil cases. The exercises begin with discovery, and students attend a Fed.R.Civ.P.26(f) meeting, dealing with required disclosures and other preliminary discovery matters. Students prepare discovery motions and responses, take and defend depositions, file dispositive motions, attend a pretrial conference, and prepare a joint pretrial memorandum. By the end of the course, each student will have simulated moving a case from the filing of a complaint to the eve of trial. Enrollment is limited. Open to LL.M. students. (Simulation) (Spring—evening)

678 Ethics in Adjudication and Settlement (3) Schaller
Consideration of ethics issues that come into play once disputes have arisen and litigation has either commenced or been threatened. Examination of the ethical rules that govern threats to sue and responses to such threats, and the rules that are particularly important once litigation has commenced. Each class focuses on a hypothetical problem involving an ethical issue or set of issues. In each hypothetical, the lawyer's duty to the client and the lawyer's duty to the court are explored through role playing. Enrollment is limited. Open to LL.M. students. (Simulation) (Spring—evening)

679 Advanced Evidence (3) Douglass
How the rules of evidence can be used to build and present a case more effectively. Topics include an overview of the theory and philosophy of the rules of evidence; the scope of the attorney-client privilege in corporate and government litigation; joint defense agreements; the role of vicarious admissions in civil and criminal litigation; hearsay; expert evidence; character evidence rules; motions in limine; impeaching witnesses; laying foundations; exhibits and charts; and the evidentiary difference between bench and jury trials. Enrollment is limited. Open to LL.M. students. (Simulation) (Fall—evening)

680 The American Jury (3) Urbina
Focus on a variety of issues that arise in civil and criminal jury trials in federal and state courts in the United States. Topics include separating judicial from jury functions; the jury pool; the grand jury; jury voir dire; challenges for cause and peremptory challenges; scientific jury selection; jury instructions; verdict forms; presentation of evidence; jury nullification; improving juror participation; impeaching verdicts; and high publicity trials. Enrollment is limited. Open to LL.M. students. (Simulation) (Fall—evening)

681 Negotiation and Conflict Management Systems Design (3) Costantino
Analysis of negotiation techniques, verbal and nonverbal communication, and other factors that influence interpersonal communication in a typical negotiation. Introduction to the theories, principles, and practices of organizational development and dispute systems design. Focus on strategies for designing systemic approaches to resolve a cluster or stream of disputes in particular organizations or institutions, including government agencies, educational and health care settings, corporations, and nonprofit organizations. The concept of "negotiating" with clients in order to develop effective conflict management systems. Students' experience with institutional clients and with individual efforts to manage conflict forms the framework for some class discussions. Enrollment is limited. Open to LL.M. students. (Simulation) (Fall—evening)

682 International Dispute Resolution (3) Ragosta
The development of international dispute settlement bodies and advocacy before them. Emphasis on the differences in context and method between advocacy settings and expectations in domestic tribunals in the United States and in international courts and tribunals. The importance of the international context for all aspects of dispute resolution—negotiation, mediation, and litigation. The necessity for sensitivity to cultural differences and expectations in international lawyering. Enrollment is limited. Open to LL.M. students. (Simulation) (Fall—evening)

683 The College of Trial Advocacy (3) Saltzburg
An intensive, six-day course focusing on trial simulation and role playing. A varying panel of experienced lawyers and judges discuss and demonstrate trial skills and ethics, and oversee and critique small-group simulations by students in making opening and closing statements and in conducting direct and cross-examination of experts and other witnesses. Enrollment is limited. Open to LL.M. students. (Simulation) (Spring)

Special Courses for Graduate Law Students

690–91 Thesis (2–2)
Students must register for two successive semesters and cannot register for both sections in one semester. (Fall, spring, summer)

694 Fundamental Issues in U.S. Law (2 or 3) Buergenthal
Required for graduate students who do not hold a law degree from a U.S. academic institution, this course consists of 2 credit hours of instruction in fundamental topics in U.S. law (e.g., constitutional law, torts, contracts, civil procedure, conflicts of law) and 1 credit hour of instruction in research techniques and legal writing. The director of the International and Comparative Law program may waive the 1-credit portion of the course for students who have been determined to have the requisite research and writing skills; such students will earn 2 credits for this course. (Examination) (Fall—day)

696 Graduate Independent Legal Writing (1 or 2) Staff
Limited to graduate students with at least a *B* average who have had a seminar or comparable course in the field of proposed research. Students are responsible for obtaining an adviser from the full-time faculty who is willing to sponsor their research. This adviser's name must be submitted to the dean at registration. Work must be completed within the semester. Students may repeat this course once for credit with the approval of the dean. (Research paper) (Fall, spring, summer)

697 Graduate Clinical Studies (1, 2, 3, or 4) Staff
Limited to LL.M. candidates. Practical experience in the student's area of specialization or interest. The student may work with a government agency, congressional committee, court, or other such entity performing tasks normally assigned to an attorney. Course approval must be obtained from the student's faculty adviser and/or the dean. Students enrolled in either the Environmental Law or Government Contracts program should refer to Law 305 and Law 340. A maximum of 4 credit hours may be applied toward graduation. Five hours of work per week are required for each credit. This course is graded on a CR/NC basis. (Fall, spring, summer)

698 Dissertation Research (0)
Candidates for the Doctor of Juridical Science degree must register for this course in four consecutive semesters (excluding the summer session), beginning with the semester of matriculation. No academic credit is given for this course.

Alphabetical List of Courses

Courses marked with an asterisk are not offered this academic year.
Courses offered through Oxford–GW Summer Program are marked with a dagger.

Adjudicatory Criminal Procedure (362)
Administrative Advocacy Clinic (632)
Administrative Law (400)
Admiralty (293)
Advanced Evidence (679)
Advanced International Trade Law (527)*
Advanced Oral Advocacy (652)*
Advanced Torts Seminar (358)*
Advanced Trial Advocacy (675)
Agency and Partnership (294)
Air and Space Law (548)
Air Pollution Control (432)
Alternative Dispute Resolution (647)
The American Jury (680)
Antitrust Law (402)
Appellate Practice (246)
Banking Law I (290)
Banking Law II (291)*
Banking Law Seminar (292)
Biotechnology Patent Policy (486)*
Broadcast and Cable Regulation (413)
Business Planning (296)
Chemical and Biotech Patent Law (480)*
Child, Family, and State (349)
Civil Litigation Clinic (624)
Civil Procedure I (212)
Civil Procedure II (213)
Civil Procedure Seminar (249)*
Civil Rights and Civil Liberties in Education (389)*
Civil Rights Legislation (388)
The Civil War Amendments: 13th, 14th, and 15th (381)*
Client Interviewing and Counseling (650)
Coastal, Navigation, and Wetlands Resource Law (437)
The College of Trial Advocacy (683)
Commercial Law Seminar (288)
Commercial Paper–Payment Systems (282)
Comparative Human Rights Institutions (572)†
Comparative Law (532)
Comparative Military Law (244)
Comparative Public Procurement (508)*
Complex Litigation (236)
Computer Law (484)
Conflict of Laws (234)
Constitutional Law I (214)
Constitutional Law II (380)
Constitutional Law and the Supreme Court (395)
Constitutional Law Seminar (309)
Consumer Mediation Clinic (620)
Consumer Protection Law (286)*
Contracts I (202)
Contracts II (203)
Control of Solid and Hazardous Wastes (RCRA & CERCLA) (442)
Copyright Law (472)
Corporate Finance (254)*
Corporate Taxation (302)
Corporation Law Seminar (262)
Corporations (250)
Creditors' Rights and Debtors' Protection (284)
Criminal Law (210)
Criminal Law and Procedure Seminar (379)*
Criminal Procedure (360)
Disabled People and the Law (635)
Dissertation Research (698)
Domestic Violence Clinic (628)
Drugs and the Law (372)
Employee Benefit Plans (272)
Employment Discrimination Law (390)
Energy Law (438)
Entertainment Law (297)*
Environmental Compliance and Enforcement Mechanisms (463)
Environmental Crimes (464)
Environmental Crimes Project (465)
Environmental Issues in Business Transactions (452)*
Environmental Law (430)
Environmental Law Clinic (627)
Environmental Law Enforcement (433)*
Environmental Law Seminar (466)
Environmental Lawyer (660)
Environmental Legislation Project (467)

Environmental Negotiations (458)
Environmental Planning (456)*
Equity (240)*
Estate and Gift Taxation (306)
Estate Planning Seminar (346)
Ethics in Adjudication and Settlement (678)
Evidence (230)
Family Law (348)
Family Law Seminar (352)
Federal Courts (232)
Federal, Criminal, and Appellate Clinic (625)
Federal Facilities Environmental Law Issues (450)
Federal Income Taxation (300)
Federal Indian Law (397)
Federal Sentencing Seminar (374)
Federal Trial Practice (642)
Feminist Legal Theory (608)
The First Amendment (382)
Food and Drug Law (408)
Foreign Direct Investment (544)
Foreign Relations and National Security Law (386)
Forensic Science (370)
Formation of Government Contracts (502)
Fundamental Issues in U.S. Law (694)
Gender Discrimination and the Law (392)
Government Contracts (500)
Government Contracts Cost and Pricing (506)
Government Contracts and Environmental Law Seminar (507)
Government Contracts Seminar (509)
Government Lawyering Seminar (420)*
Graduate Environmental Placement (468)
Graduate Government Contracts Placement (510)
Graduate Independent Legal Writing (696)
Graduate Outside Placement (697)
Health Care Law (410)
Health Care Law Seminar (411)
Health Law Rights Clinic (631)
History of the U.S. Constitution (594)*
Housing Rights Law (338)
Human Rights Advocacy and Dissemination (578)†
Human Rights and Refugee Law (574)†
Human Rights and Women (576)†
Human Rights Lawyering (568)†
Humanitarian Law and Populations at Risk (582)†
Immigration Clinic (630)
Immigration Law I (538)
Immigration Law II (539)
Independent Legal Writing (656)
Individual and Group Rights (580)†
Individual Employment Rights (268)
Insurance (298)
Intellectual Property Antitrust Seminar (494)
Intellectual Property Issues Short Seminar (498)*
Intellectual Property Law Journal (662)
Intellectual Property Law Seminar (496)
Intensive Clinical Placement (638)
International and Comparative Patent Law (490)
International Arbitration (556)
International Banking (542)
International Business Transactions (522)
International Business Transactions Seminar (564)
International Commercial Law (524)*
International and Comparative Patent Law (490)
International Criminal Law (554)
International Dispute Resolution (682)
International Environmental Law (454)
International Law (520)
International Law, Ethics, and Conflict (553)*
International Law of Human Rights (546)
International Law of Territory (551)
International Litigation (528)
International Negotiations (558)
International Organizations (530)
International Taxation I (312)
International Taxation II (313)
International Trade and Environmental Law (435)
International Trade Law (526)
Introduction to Advocacy (217)
Japanese Patent Policy (488)*
Journal of International Law and Economics (659)
Jurisprudence (590)
Jurisprudence Seminar (592)
Labor and Employment Law Seminar (276)*
Labor Law (266)
Labor Standards (274)*
Land Development Law (336)
Land Use Law (332)

Law and Accounting (602)*
Law and Criminology (366)
Law and Economics (598)*
Law and Literature (606)
Law and Medicine (617)
Law and Psychiatry (614)*
Law and Psychology (615)*
Law and the Deaf (636)
Law and Social and Economic History (596)
Law in Cyberspace (485)*
Law of Criminal Corrections (368)*
Law of Japan (536)
Law of Privacy (398)
Law of Real Estate Financing (334)
Law of Separation of Powers (384)*
Law of the European Union (534)
Law of the Sea (550)
Law of War (552)
Law Review (658)
Law, Science, and Technology Seminar (462)*
Law Students in Court (634)
Legal Activism (637)
Legal History Seminar (597)
Legal Problems of the Elderly (353)
Legal Research and Writing (216)
Legislation (416)
Legislative Analysis and Drafting (418)
Licensing of Intellectual Property Rights (478)
Local Government Law (422)
Mediation (646)
Mediation and Alternative Dispute Resolution (676)
Modern Real Estate Transactions (330)
Moot Court (644)
Natural Resources Law (440)
Natural Resources Taxation (310)*
Negotiation and Conflict Management Systems Design (681)
Negotiations (648)
Nonprofit Organizations: Law and Taxation (314)
Nuclear Energy Law (446)*
Outside Placement (633)
Partnership Taxation (304)
Patent Enforcement (482)
Patent Law (470)
Patent Policy and Practice (476)*
Pension Law and Taxation (307)
Performance of Government Contracts (503)
Pre-Trial Advocacy (643)
Pre-Trial Practice in Civil Cases (677)
Print Media Law (412)
Prisoners Project (376)
Products Liability (354)
Professional Responsibility and Ethics (218)
Professional Responsibility and Ethics Seminar (593)*
Property (208)
Property and Real Estate Seminar (340)
Public Contract Law Journal (661)
Public Economic Policy and the Law (608)
Public International Law Seminar (562)
Public Law Seminar (426)*
Quantitative Analysis for Lawyers (604)*
Race, Racism, and American Law (595)
Real Estate and Income Taxation (308)*
Refugee and Asylum Law (540)
Regulated Industries (406)*
Regulation and Management of Ecosystems (441)*
Regulation of Investment Companies and Advisers (260)
Regulation of Pesticides and Industrial Chemicals (FIFRA & TSCA) (444)
Regulation of Securities Markets and Professionals (258)*
Remedies (238)
Research and Writing Fellow (666)
Research and Writing Fellow—International (667)
Secured Transactions (280)
Securities Law Seminar (264)*
Securities Regulation (252)
Sexuality and the Law (394)
Small Business Clinic (621)
Sports Law (295)
State and Local Taxation (316)
Survey of U.S. Legal History (591)
Takeovers and Tender Offers (256)*
Tax Policy Seminar (318)
Telecommunications Law (414)
The New Due Process (570)‡
Thesis (690–91)
Torts (206)
Toxic Tort Litigation (449)
Trademark Law (474)
Traditional Jewish Civil Law (537)
Trial Advocacy (640)
Trial Court Competition (654)
Trusts and Estates I (342)
Trusts and Estates II (343)*
Unfair Trade Practices (404)
Vaccine Injury Clinic (626)
Water Pollution Control (434)
Water Resources Law (436)
White Collar Crime (364)

The University

History and Organization

The George Washington University had its beginning in 1821 as the Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character, it provided "that persons of every religious denomination shall be capable of being elected Trustees, nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as Foggy Bottom, between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area contains several reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for 50 years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian School of Arts and Sciences and the professional schools, which include the Law School, the Elliott School of International Affairs, the Graduate School of Education and Human Development, and the Schools of Medicine and Health Sciences, Public Health and Health Services, Engineering and Applied Science, and Business and Public Management.

Academic Status

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools. The University is on the approved list of the American Association of University Women and is a member of the College Board.

Location

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the Department of the Interior, the General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

A campus in Northern Virginia for graduate studies, research projects, and professional development programs is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

The Board of Trustees of the University

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member. Trustees who are GW alumni are indicated by an asterisk. Locations are indicated for trustees outside the Washington metropolitan area.

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The George Washington Law Alumni Association

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Index

Academic integrity, policy on, 34
Academic work load
  J.D., 9; LL.M., 21
Accreditation, University, 88
Admission
  J.D., 7; LL.M., 16; S.J.D., 24
Advanced standing, J.D. degree, 7
Alumni associations, 91
American Intellectual Property Law Association Quarterly Journal, 36
Attendance, 13, 24
Board of trustees, 89
Calendar, academic, 4
Career development and placement services, 38
Changes in program of study
  J.D., 13; LL.M., 23
Consortium, 23
Continuing legal education, 38
Continuous enrollment, J.D., 14
Course descriptions, 49
Course offerings, time of, 33
Credit for courses in other GW schools
  J.D., 14; LL.M., 23
Credit/no credit option, 11
Curriculum, J.D., 8, 42; LL.M., 18
Degree requirements
  J.D., 8; LL.M., 17; S.J.D., 25
Disability support services, 39
Dismissal of students, 40
Doctor of Juridical Science degree, 24
Drugs, University policy on, 41
Employment, student, 10
Enrichment program, 35
Entrance requirements
  J.D., 7; LL.M., 16; S.J.D., 24
Environmental law, LL.M. program in, 18
Environmental Lawyer, 35
Equal opportunity, University policy on, 40
Evaluation, method of
  J.D., 10; graduate programs, 22
Examination, failure to take, 12, 22
Exclusion and probation for low scholarship, 13
Facilities and services, 37
Faculty, 94
Fees and financial regulations, 26
Fellowships, graduate, 31
Financial aid, 29
George Washington Law Review, 35
Government procurement law, LL.M. program in, 19
Government procurement and environmental law, LL.M. program in, 19
Grades
  J.D., 10; graduate programs, 21
Graduation requirements, 34
Health and accident insurance, 39
Health service, student, 39
Honors
  J.D., 11; LL.M., 22
Housing, 38
Intellectual property law, LL.M. program in, 20
Intellectual Property Law Journal, 36
International and comparative law, LL.M. program in, 20
International environmental law, LL.M. program in, 19
Jacob Burns Law Library, 37
Joint Juris Doctor–Master's degree programs, 15
Joint LL.M.–M.P.H. program, 21
Journal of International Law and Economics, 35
Juris Doctor degree, 7
Law School Admission Test, 7
Law School Data Assembly Service, 7
Leave of absence, 14
Legal writing requirement, 9
Litigation and dispute resolution, LL.M. program in, 21
Loan funds, 30
Marvin Center, 38
Master of Laws degree, 16
Moot court competitions, 36
Officers of administration, 91
Order of the Coif, 11
Oxford–GW summer program, 33
Participation, class, 11, 22
Prizes and awards, 32
Probation, 13
Programs, right to change, 41
Public Contract Law Journal, 35
Public interest support funds, 29
Publications, 35
Readmission
  J.D., 14; LL.M., 24
Refunds, 28
Registration, 33
Regulations, academic
  J.D., 9; graduate programs, 21
Regulations, financial, 26
Regulations, University, 40
Reinstatement, procedure for, 13
Release of student information, 40
Research paper deadlines, 12, 23
Residence requirements
  J.D., 8; LL.M., 17; S.J.D., 25
Rules, right to change, 40
Scholarship funds, 29
Skills boards, 36
Smith Center, 38
Student activities and student life, 35
Student conduct, 41
Student health service, 39
Student organizations, law, 36
Summer school credit from other law schools, 15
Summer session, 33
Test of English as a Foreign Language, 16
Thesis requirement, master's, 17
Thesis waiver, 18
Transcripts of record, 34
Transfer students, 7
Tuition, 26
Veterans benefits, 31
Visiting at another law school, 14
Visiting (unclassified) students, 8
Withdrawals, 28

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School of Medicine and Health Sciences: Bachelor of Science in Health Sciences (B.S.H.S.), Master of Science in Health Sciences (M.S.H.S.), and Doctor of Medicine (M.D.)

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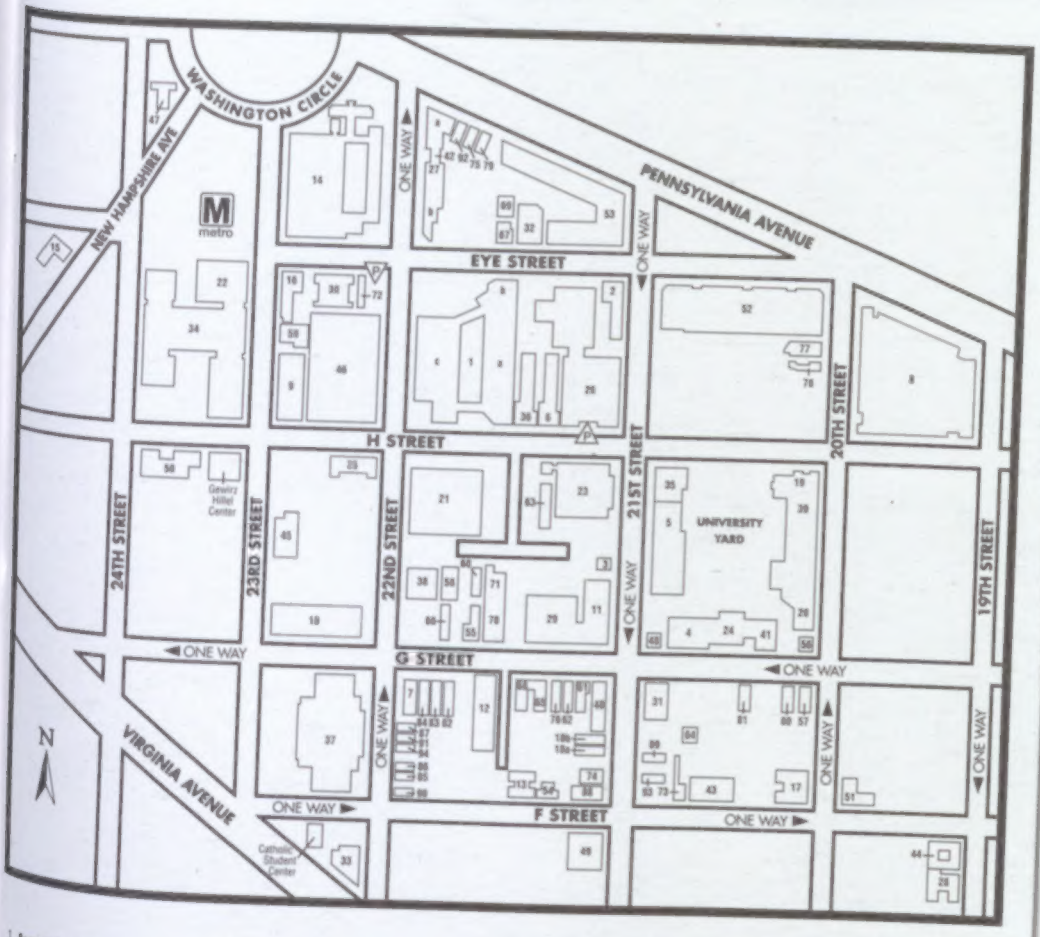
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Graduate School of Education and Human Development: Master of Arts in Education and Human Development (M.A. in Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

School of Business and Public Management: Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Finance (M.S.F.), Master of Science in Information Systems Technology (M.S.I.S.T.), Master of Science in Professional Accounting (M.S.P.A.), Master of Science in Project Management (M.S.P.M.), Master of Taxation (M.Tax.), Master of Tourism Administration (M.T.A.), and Doctor of Philosophy (Ph.D.)

Elliott School of International Affairs: Bachelor of Arts (B.A.), Master of Arts (M.A.), and Master of International Policy and Practice (M.I.P.P.)

School of Public Health and Health Services: Bachelor of Science (B.S.), Master of Science (M.S.), Master of Public Health (M.P.H.), Master of Health Services Administration (M.H.S.A.), Specialist in Health Services Administration (Spec.H.S.A.), and Doctor of Public Health (Dr.P.H.)



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